2020 Doctor's Thesis

Cash holdings management by non-financial listed firms in Vietnam

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CHAPTER 1. INTRODUCTION

1.1. Motivations and objectives

Efficient cash holdings management is essential in all businesses because cash holdings ensure liquidity for firms. Firms may go bankruptcy-even those are large companies-when they do not have enough cash to pay their bills. Apart from financing daily operations, Cruz et al. (2019) state that cash holdings can be seen as financing choices because cash holdings can be used to seize profitable investment opportunities, to reduce the cost of assessing external funds, to service debt during economic difficulty, to protect firms against future shortfalls, cash flows volatility. Therefore, research on cash holdings plays an important part in financial literature.

Cash holdings can reveal many things about firms. For example, Opler et al. (1999) find that firms with more growth opportunities, less access to capital markets, higher business risk hold more cash. Bate et al. (2009) find out cash accumulation in US firms from 1980-2016. Specifically, the cash ratio has increased by 0.46 % per year because of the increase in firms' cash flow risk, the decrease in inventories and receivables. However, cash accumulation may show firms have agency problems. The agency cost view of corporate cash holdings suggests that managers who less act for shareholders' benefits accumulate cash and invest it in negative NPV projects or use it to overpay in acquisition (Dittmar et al., 2003).

When managers care about their benefits instead of shareholders' wealth, high cash balances can be found in those companies. Therefore, I am motivated to explore corporate cash holdings management in Vietnam, where the majority of listed firms in the economy were equitized from 100% state-owned firms-a fertile ground for agency problems-to see whether state ownership has a positive impact on cash holdings. How do cash holdings management change after equitization?

Besides, under the development of technology, the costs to converse short-term financial assets into real cash are low, and the time to process the transaction is faster than before. These bring about the chance for managers to invest idle cash in short-term financial investments to reduce the cost of

carrying liquid assets. Besides, short-term financial investment management in a developed country like the US is far different from a developing country. Hence, I am keen on researching short-term financial investments in relation to cash holdings and comparing the two styles of liquid assets management.

With these motivations, the objective of this thesis is to discover the cash holdings management of firms in Vietnam, focusing on analyzing the agency problems in Vietnam and the changes in cash holdings after equitization. First, the author aims at figuring out the factors that influence cash holdings, especially verifying the positive effect of state ownership on cash holdings and the impact of exposure to the market by the time. Second, the author would like to look deep into liquid assets management to the extent of how much cash holdings are held for short-term transaction purposes and how do firms manage the rest of the liquid assets.

1.2. Research questions

This thesis will try to provide answers to the questions below:

- Why is efficient cash holdings management so important for the survival and development of enterprises? What are the most typical determinants of cash holdings based on theories, and what have researchers been discovering determinants of cash holdings?

- What factors affect the cash holdings of listed firms in Vietnam? Do agency problems inherent in state ownership affect corporate cash holdings, and do the equitization helps to reduce agency problems?

- What do short-term financial investments explain the changes in cash holdings management in Vietnam? What factors affect short-term financial investments in Vietnam?

By answering the questions above, this thesis would become a reference source for other studies on cash holdings management, especially for research related to Vietnamese corporate cash holdings in the future. Enterprises also can use this thesis as a reference source to have the knowledge to set efficient cash policies based on their own circumstances.

1.3. Outlines and methodology

This thesis has five chapters: Chapter 1: Introduction; Chapter 2: A literature review on corporate cash holdings management; Chapter 3: Corporate cash holdings and agency problem: Evidence from Vietnam; Chapter 4: What do short-term financial assets explain the corporate cash holdings changes in Vietnam; and Chapter 5: Conclusion. The flow of the thesis's outline is that: based on the literature review in Chapter 2 and the unique setting of Vietnam, I develop hypotheses for Chapter 3 and Chapter 4. First, in Chapter 3, Figure 3.2. illustrates that both cash holdings and state ownership have downtrends from 2010-2017. Next, the univariate test shows the monotonic relation between cash holdings and state ownership as firms with higher cash ratios are the firms with high state ownership ratios in terms of both mean and median values. Last, the regression results indicate that the positive effect of state ownership on cash holdings diminished as time passed after equitization. Instead of holding liquid assets under cash and cash equivalents, firms may keep them in types of short-term financial investments likes stocks, bonds, certificate of deposits. Therefore, in Chapter 4, I look into the trend of cash holdings simultaneously with short-term financial investments and the total liquid assets. It was found that the proportion of short-term financial investments increase annually, while the cash and cash equivalents ratio decline annually. Specifically, managers became more adept at managing liquid assets portfolio when they moved cash equivalents to invest in short-term financial investments to reduce the cost of holding liquid assets. Moreover, this action makes the cash and cash equivalents to total assets ratio smaller. It also somewhat is a way to keep money under the control of management rather than return it to shareholders.

In the following, I briefly introduce the content of three main parts of my thesis: Chapter 2, Chapter 3, and Chapter 4.

Chapter 2 provides a profound knowledge of corporate cash holdings and short-term financial investments that will be used in Chapters 3 and 4. This chapter would answer the first research question group by presenting typical factors that affect cash holdings as the predictions of theories. Besides, by

systematizing prior empirical studies with new findings on the determinants of cash holdings, this part provides information about the investigations into determinants of corporate cash holdings until now.

Chapter 3 examines the effects of state ownership, age after equitization, and the interaction term between state ownership and age after equitization on corporate cash holdings of listed firms on Vietnamese stock exchanges from 2010 to 2017. Financial information and state ownership ratios of non-financial listed firms on the Ho Chi Minh Stock Exchange (HOSE) and the Hanoi Stock Exchange (HNX) over eight years (2010-2017) are used for analysis. I use both univariate analysis and OLS regression models to check the effect of state ownership, age after equitization, and cross-term between state ownership and age on cash holdings. The first appearance of Chapter 3 is in the Economic Science, Vol. 68, No. 1, June 2020.

Chapter 4 is also an empirical study that shows the relation between cash holdings and short-term financial investments and investigates the determinants of short-term financial investments of listed firms in Vietnam. The sample of this chapter includes non-financial Vietnamese listed firms covering five years from 2014 to 2018, leading to an aggregate sample of 2924 firm-year observations. The data shows that Vietnamese listed firms keep their liquid assets mostly under the two traditional types as cash and cash equivalents. Besides, managers invest most firms' idle cash in held to maturity accounts. Finally, I use both univariate and regression models to examine factors that affect the short-term financial investment ratio.

1.4. Contributions

Regarding Chapter 2, there are several studies about a literature review related to cash holdings. For example, Almeida et al. (2014) present a literature review on corporate liquidity management; Amess et al. (2015) show agency reasons to hold cash; Cruz et al. (2019) compile and systematizes the available knowledge of cash holdings, both the determinants of cash holdings and the effect of cash

holdings on firm value. In this chapter, I only focus on the papers that have new perspectives about the determinants of cash holdings. I arrange papers according to the year published to show the investigations into determinants of cash holdings by the time.

Regarding Chapter 3, in recent studies, researchers are interested in examining the effect of state ownership on cash holdings. However, both theories and empirical evidence still show different results. In particular, Chen et al. (2018) provide evidence that state ownership positively influences corporate cash holdings, consistent with agency theory. In contrast, using a sample of Chinese listed firms, Megginson et al. (2014) found that state ownership is negatively connected with corporate cash holdings. In sum, the relation between state ownership and cash holdings is still an empirical question. Hence, the first contribution of Chapter 3 is shedding light on the positive association between state ownership and corporate cash holdings in Vietnam. Besides, unlike findings by Megginson et al. (2014), this chapter shows the coefficients of the interaction term between state ownership ratio and bank debt are negative and significant, which indicate that the majority of equitized listed firms in the case of Vietnam do not have soft budget constraints. The reason may be most of those firms belongs to non-strategic segments of the Vietnamese government.

Second, Chapter 3 shows the new evidence that age after equitization negatively influences cash holdings in the context of SOEs. This evidence is new in the corporate finance literature and makes this study different from the prior studies. In particular, the regression results show the negative coefficients of age from equitization and the interaction term between firm age from equitization and state ownership ratio. Therefore, the time passes after equitization will moderate the effect of state ownership on cash holdings. All these significant findings of Chapter 3 were included in the content of the paper with the title: "Corporate cash holdings and agency problem: Evidence from Vietnam," which have already peer-reviewed and published in The Economic Science, Vol. 68, No. 1, June 2020.

Third, the regressions and univariate tests show that agency theory is dominant in explaining corporate cash holdings by Vietnamese listed firms. This detection supports the view that agency

problems are likely to exist in firms invested by the State. Thus, these firms need to have adequate measures to diminish agency problems.

Chapter 4 fills the gap in finance literature by providing evidence of the allocation of liquid assets in a developing country that almost idle cash is invested in held-to-maturity assets that bring safe and periodic returns for firms. This is different from liquid assets management in the US. Duchin et al. (2017) show that industrial firms in the US allocate heavily in non-cash securities that are both risky and illiquid. This chapter also documents that larger firms and older firms have higher proportions of short-term financial investments, while firms with higher sales growth hold less short-term financial assets. Moreover, the significant positive relation between age from equitization and short-term financial investment ratio implies that managers become more adept at managing liquid assets after equitization.

CHAPTER 2. A LITERATURE REVIEW ON CORPORATE CASH HOLDINGS MANAGEMENT

2. 1. Introduction

Firms live in an imperfect world where raising external funds is costly. The cash inflows and cash outflows are usually not synchronized, and future cash flows are affected by unexpected business risks. Therefore, efficient cash holdings management is vital to the success of any firm because cash holdings ensure the liquidity for firms running without disruption. First, cash holdings finance daily operations, protect firms against future shortfalls due to unexpected changes in cash flows. Firms may get into trouble if they do not have enough cash to pay their bills. Moreover, cash holdings can be seen as financing choices because cash holdings can be used to seize profitable investment opportunities with lower costs in comparison with thereof external funds (Cruz et al., 2019). Besides, during difficult times, cash holdings serve as a resource to overcome difficult times and mitigate risks (Acharya et al., 2007). Therefore, researchers have much interest in discovering the determinants of corporate cash holdings as well as seeking models to determine the optimal cash balance for firms.

The main theories that predict factors affect cash holdings are trade-off theory, pecking-order theory, and agency theory. The trade-off theory was developed based on equating the cost of raising capital and the benefit of holding cash. The higher the possibility of being in a cash shortage, the higher the cost of raising capital for firms is (Opler et al. 1999). Therefore, factors that make the cost of raising capital increase-such as the high volatility cash flow, an increase in the number of positive NPV investment opportunities-positively affect cash holdings and vice-versa.

The pecking-order theory for cash holdings management was inferred from Myers and Majluf (1984) 's points of view that raising capital from outside is always more expensive than using internal funds due to the information asymmetry between outsiders and managers. Accordingly, factors that increase information asymmetries, such as firms with more R&D costs and more investment opportunities, urge managers to retain higher internal funds, leading to a higher cash holdings level.

The agency theory considers that managers may have incentives to retain cash to hunt their objectives at shareholder expense (Opler et al., 1999). This problem is likely to happen in firms that can generate substantial free cash flows (Jensen 1986), big firms with higher shareholder dispersion, poor investment opportunities (Opler et al. 1999), firms that have state ownership (Chen et al. 2018).

Apart from the above theories, Megginson et al. (2014) applied the soft-budget constraint (SBC) theory formulated by János Kornai to explain the negative effect of state ownership on corporate cash holdings in China. Based on SBC theory, firms with high state ownership are easier to get funds from state-owned banks; thus, they hold less cash.

Obviously, each theory is based on a different argument, so one theory cannot explain all determinants of cash holdings that other theories cover, and some predictions about determinants of cash holdings may overlap among theories. For example, the trade-off theory is based on the cost of raising capital. Accordingly, factors that make firms difficult to raise cash, or the higher cost of raising capital (such as small firms, firms with greater growth opportunities) will force firms to reserve high cash. However, the soft-budget constraint theory is only based on the point that state-owned firms can rely on state banks to finance their liquidity need. Therefore, the only factor that said how much a firm is connected with the state is the state ownership ratio; other factors are not explained by the soft-budget constraint theory.

Regarding the empirical studies on cash holdings, there are several literature review studies. For example, Almeida et al. (2014) present a literature review on corporate liquidity management; Amess et al. (2015) show agency reasons to hold cash; Cruz et al. (2019) compile and systematize the available knowledge on cash holdings, both the determinants of cash holdings and the effect of cash holdings on firm value. Hence, in this part, I only focus on the papers with new perspectives about factors that affect cash holdings to see how the factors were discovered by the time.

For decades, firms have increased their fraction of liquid assets to total assets, more than twofold in cases of US firms (Azar et al., 2016) because of some main reasons such as an increase in cash flow volatility, R&D and/or competition, changes in production technology (Bate et al., 2009;

Brown and Petersen, 2011; Gao, 2018). Therefore, there is a significant change in liquid assets portfolio management. Azar et al. (2016) investigate that the proportion of non-interest-bearing cash or real cash to total liquid assets is kept at about 100% in the 1950s, 60% in 1980, but just about 20% in the early of 2010s. The rest of the liquid assets are allocated to many types of interest-bearing assets, ranging from savings and deposits to stocks, market mutual funds. Research on cash holdings management models also has been much developed. For example, if the seminal models by Baumol (1952), Miller and Orr (1966) only consider determining an optimal real cash level for firms, Duchin et al. (2017) developed a model that works for the new situation. Duchin et al. (2017)'s model allows firms to invest in a range of financial assets, including liquid and illiquid assets, as well as safe and risky assets.

2.2. Overview of cash holdings management

2.2.1. The definition of cash holdings

Cash and cash equivalents are used to refer to real cash (currency note, coin, demand bank deposits) and insignificant short-term investments that are easily exchanged into cash without losing the value and usually mature in three months or less (according to the US's generally accepted accounting principles-GAAP or The International Financial Reporting Standards). The purpose of holding these kinds of short-term investments is to meet cash commitments in the short-term rather than aim to make profits from them or other things, so these investments are called cash equivalents. Corporate fund managers also use this interpretation as they ascertain the amount of cash by looking at the first account on the balance sheet of a company-cash and cash equivalents account (Brigham and Houston, 2009). In other words, Ross et al. (2002) said that financial managers frequently use the word "cash" for the total amount of cash, along with cash equivalents or near-cash. Therefore, in Chapter 3 and Chapter 4 of this thesis, I follow the above definition for "cash" or cash holdings that include cash and cash equivalents. For that cash holdings, the cash ratio used in my research (Chapter 3 and Chapter 4) is calculated as the ratio of cash and cash equivalents to total assets, following Ozkan and Ozkan (2004), Cheung (2016).

2.2.2. Reasons for holding cash

Economics and finance literature has documented main reasons for holding cash, which are transaction purpose, precautionary purpose, speculative purpose, tax purpose, agency conflicts, and incentives (Bate et al., 2009, Cruz et al., 2019):

- The transaction purpose: first and foremost, firms must keep cash for their transaction purposes or dealing with operational needs (Cruz et al., 2019). Firms need cash to pay their suppliers, salary to their staff.

- The precautionary purpose: a company holds cash more than its needs to deal with unexpected risks related to future economic or business environments (Cruz et al., 2019). Some risks can be mentioned, such as a sharp increase in inflation or interest rates, a sudden decrease in sales in the future.

- The speculative purpose: firms may hold cash more than their transaction needs to seize attractive investment opportunities that may appear on the financial market at any time. Furthermore, holding cash in firms rather than paying back to shareholders helps managers to exploit growth opportunities, to avoid higher costs of raising external capital, and to increase firms' financial flexibility (Gamba and Triantis, 2008; Rapp et al., 2014).

- The tax purpose: to avoid repatriation taxes, firms keep high levels of cash, hold this cash overseas in affiliates that cause high tax cost on repatriating income (Foley et al., 2007).

- The agency incentives: entrenched managers would retain cash rather than pay it back to shareholders because this helps avoid market discipline (Jensen, 1986; Opler et al., 1999).

2.3. Determinants of cash holdings

Understanding the influences on corporate cash holdings in business practice would be a critical insight into the dynamic cash holdings management and corporate decision. The theoretical background of cash holdings is documented in numerous prior studies such as Opler et al. (1999), Ozkan and Ozkan

(2004), Ferreira and Vilela (2004), Bates et al. (2009), Bigelli and Sánchez-Vidal (2012), Chen et al. (2018), and Megginson et al. (2014). The main theories include trade-off theory, pecking order theory, agency theory, and soft budget constraint theory.

2.3.1 Theories of determinants of cash holdings

2.3.1.1. The trade-off theory

The trade-off theory considers the marginal costs and marginal benefits of holding cash when determining the level of cash holdings. First, firms keep cash on hand for transaction purposes. Firms need cash to pay wages, commercial debts, and taxes and to invest in profitable projects. In a case of being short of cash, firms have to raise cash by selling assets or using financial markets (issuing new debt and/or equity). All those activities are costly, and the higher the cash shortage, the higher transaction costs for raising cash (Opler et al., 1999). In contrast, the cost of holding cash is the low pecuniary expected return and does not vary with the amount of cash. Therefore, firms with higher transaction costs for raising cash or higher probability of cash shortfall hold more cash. The most common determinants that affect the cost of being short of cash and the probability of cash shortage as below:

(1)   The firm size

The economies of scale bring about lower costs of capital for larger firms. Usually, the larger the enterprise, the higher ability to access cheaper funds due to possessing more assets, better credit rating, and business reputation. Hence, larger firms are likely to hold less cash than smaller firms. On the contrary, smaller companies are characterized by higher information asymmetries (Berger et al., 2001; Ozkan and Ozkan, 2004), more financial constraints (Fazzari and Petersen, 1993), and more likely to suffer financial distress (Titman and Wessel, 1988). Compared to large firms, raising cash from outside is more expensive for small firms; they tend to have higher cash holdings.

(2)   Investment opportunities

Ozkan and Ozkan (2004) argue that firms with a number of profitable investment opportunities may have to give up some of these investments if they are short of cash. Those companies, therefore, tend to hold greater cash to reduce the likelihood that they will have to give up valuable investment projects. Moreover, it is important to note that firms with greater growth opportunities lead to higher costs of financial distress and bankruptcy cost (Harris and Raviv, 1990; Shleifer and Vishny, 1992; and Williamson, 1998) because growth opportunities are intangible in nature and unrealized profits. This would, in turn, imply that in order to avoid financial distress and bankruptcy, firms with greater growth opportunities have more incentives for holding more cash (Ozkan and Ozkan, 2004).

(3)   Cash flows from the operation

If a firm can generate more net cash flow from its operation, the probability of cash shortage is lower because cash flow provides a ready source of liquidity (Kim et al. 1998). Therefore, according to the trade-off model, firms hold less cash if they earn more money.

Besides, the volatility of future cash flows is also a determinant of cash holdings. According to Opler et al. (1999), firms may have more outlays than expected if they face cash flow uncertainty. Thus, firms with greater cash flow volatility tend to hold more cash.

(4)   Networking capital

Other current assets could be converted into cash in case of a cash shortfall. Therefore, firms that have more non-cash liquid assets substitutes hold less cash (Ferreira and Vilela, 2004). Besides, Opler et al. (1999) document that the cash conversion cycle is short for firms having multiple product lines or low inventory turnovers. Consequently, the likelihood of cash shortage is lower for those firms; they hold less cash.

(5)   Fixed assets

Firms with more fixed assets can be used as collateral, easier to raise debt (Titman and Wessels, 1988). Therefore, firms that have more fixed assets are expected to hold less cash. Also, diversified

firms are likely to hold less cash than specialized/focused firms because they can sell non-core segments when they need to (Opler et al., 1999).

(6)   Leverage

On the one hand, the higher the debt level leads to the higher transaction cost for raising more cash in case of being short of cash. In order to reduce the probability of experiencing financial distress and bankruptcy, firms with high leverage are expected to hold more cash. On the other hand, one would argue that the level of debt shows the ability of firms to issue debt. Thus firms with high debt ratios hold less cash (Ozkan and Ozkan, 2004; Ferreira and Vilela, 2004).

(7)   Bank debt

Banks provide a loan for a project after they evaluate that it is a good project. Ozkan and Ozkan (2004) state that banks have a comparative advantage as lenders in collecting and processing information, getting access to information not otherwise publicly available. Therefore, borrowing firms can be seen to have creditworthiness. The existence of bank relationships would bring about firms' ability to access external finance or renegotiate their loans when they need it. This means that firms with high bank debt ratios are expected to have a lower cash shortage probability. Consequently, it is expected that the cash ratio and bank debt ratio have a negative relationship.

(8)   Dividends

In case of a cash shortage, current dividend-paying firms can easily cut their dividends to raise capital at low cost, whereas non-dividend-paying firms have to raise cash from markets outside. Trade-off theory, therefore, predicts that dividend payment and cash balance have a negative relationship (Opler et al., 1999).

2.3.1.2. The pecking order theory

According to this theory, due to information asymmetries, raising capital from outside becomes harder for firms than using internal sources. Undoubtedly, outsiders know less than managers; they may

ask for the higher cost of capital to make sure their investments are not overpriced. Therefore, firms prefer internal finance to external finance, and the pecking order of financing is first retained-earnings, then debt, and finally, new equity (Myers, 1984). Dittmar et al. (2003) argue that there is no optimal level of cash in the world of the pecking order theory, just as there is no optimal level of debt. Cash balances are simply the result of the investment and financing decisions made by firms.

(1)   The firm size

Larger firms are presumed to be more successful; therefore, they are likely to have more cash after controlling for investments (Opler et al. 1999).

(2)   Investment opportunities

Firms with a number of investment opportunities for increasing their value have high capital demands (Ferreira and Vilela, 2004). The problem is that such firms invest a lot so that if investment expenditures happen discretely, in the case of cash shortfall, they have to raise costly external financing or forgo their valuable investments. Therefore, Opler et al. (1999) argue that those companies averagely hold more cash in order to pay for investment expenditures.

(3)   Leverage/bank debt

From the point of view of pecking order theory, enterprises typically raise debt when their internal capital is not sufficient to finance their investments. This suggests that firms with high leverage when they are in cash shortfalls, and therefore, use borrowing as a cash substitute. In other words, leverage and bank debt negatively influence cash holdings.

(4)   Operating cash flow

According to the pecking-order theory, firms tend to use their internal fund to avoid external financing, which is more expensive (Myers, 1984). Firms with high cash flows pay dividends, pay off their debts, and accumulate cash (Dittmar et al., 2003). Therefore, firms hold more cash when they make larger cash flow from their operations.

2.3.1.3. The agency theory

There is a separation between shareholder(s) and managers; there is a chance of agency problems. Conflicts of interest between shareholders and managers would be especially severe when firms generate a large amount of cash. Payouts to shareholders reduce funds under managers' control, thereby reducing managers' power and making it more likely they will suffer the monitoring of the capital market when the firms must raise capital (Jensen, 1986).

From this point of view, Opler et al. (1999) argue that management may have incentives to hoard cash to have more flexibility to pursue their own objectives at shareholders' expense. Firstly, due to risk-averse, entrenched managers may hold excess cash to avoid market discipline. Second, cash allows managers to invest in projects that are not easily financed by capital markets. The managers may not be able to obtain debt whenever they want to; however, they can consume cash whenever they want to. Third, management prefers to accumulate a high cash level, keeping funds within the firm rather than pay it back to shareholders. Having the cash, however, management must find projects to spend it, and therefore in the case that good projects are not available, they will invest in poor projects.

Following are situations that increase the likelihood of holding excess cash under agency theory:

(1)   Firm size

It is expected that larger firms are likely to have higher shareholder dispersion leading to an increase in discretionary power for managers over investment and financial decisions. Therefore, in larger firms with higher shareholder dispersion, a greater amount of cash is accumulated. This cash accumulation makes it easier for managers to stay independent from external funds and follow their investment policies (Opler et al. 1999).

(2)   Investment opportunities

Opler et al. (1999) state that firms with poor investment opportunities force managers to hold more cash to facilitate an investment program that would be difficult to obtain external finance.

(3)   Leverage

Firms having a low debt level are less subject to monitoring by banks or financial institutions. Therefore, it is expected firms with low debt tend to hold excess cash (Opler et al., 1999; Ferreira and Vilela, 2004).

(4)   Dividend

Jensen (1986) argues that capital markets would punish dividend cuts with large stock price reductions. Therefore, it is expected that managers in dividend-paying firms reserve more cash to make sure the dividend payment, all else equal.

(5)   State ownership

It is argued that high state ownership is associated with weaker monitoring by non-state shareholders or outsiders, serious information asymmetry, and more agency problems. Therefore, according to this agency theory, firms with high state ownership ratios hold more cash. Consistent with this view, Chen et al. (2018) provide empirical evidence of the positive association between state ownership and corporate cash holdings. Also, they find that privatized state-controlled firms or politically connected firms have higher cash levels than their counterparts. For the sample of listed firms in China, Kusnadi et al. (2015) find that state-controlled firms hold more cash than non-state-controlled firms.

2.3.1.4. The soft-budget constraint theory

There is a phenomenon investigated by János Kornai that the chronic loss-making Hungarian state-owned enterprises (SOEs) were never allowed to go bankrupt during that country's experiment with market reforms (Kornai, 1979, 1980). These firms were always rescued from financial difficulties by government subsidies called soft-budget constraints (SBC).

Therefore, Megginson et al. (2014) argue that state ownership is inherently connected with soft-budget constraints: the higher the state ownership, the softer the budget constraint, or the less financially

constrained the firm is. Firms with softer budget constraints reserve fewer cash holdings. In other words, state ownership is negatively related to cash holdings.

In summary, theories may give different predictions about the factors that affect cash holdings because they are based on different arguments. Table 2.1 summarizes these differences.

Table 2.1 The expected results for factors affect cash holdings according to theories

Variables	Trade-off	Pecking order	Agency	SBC
Investment opportunities	Positive	Positive	Negative	
Size	Negative	Positive	Positive	
CF	Negative	Positive		
Net working capital	Negative			
Fixed assets	Negative			
Leverage	Positive/ negative	Negative	Negative	
Bank debt	Negative	Negative	Negative	
Dividend	Negative		Positive	
State ownership			Positive	Negative

2.3.2. Empirical evidence of determinants of cash holdings

Cruz et al. (2019), who systematize all types of research related to cash holdings (including determinant of cash holdings and the value of cash holdings, the sensitivity of cash to cash flow and/or to investment) and give a general feature of all papers. From their paper, I only select the papers with new findings of the factors that affect cash holdings to make Table 2.2 and Table 2.3 and give the detailed feature of this type of research on cash holdings. In Table 2.2 and Table 2.3, I systematize the studies on determinants of cash holdings with new findings of internal and external factors, respectively.

Papers of each group are presented according to the year papers published to see how the knowledge about determinants of cash holdings is discovered and expanded.

According to the two Tables 2.2 and 2.3, there are a total of 34 studies with new investigations of factors that affect cash holdings from 1998-2018. The two Tables reveal that the majority of papers employ the pooled OLS regression method with fixed effects. Besides, approximately 68% of the total studies were published from 2009-2016. The average research period is quite long for about 17 years, and 73.4 % of total studies are conducted using a sample of firms in the US or firms in the world. In more detail, 15 papers use the data about US firms; 10 papers use data about firms around the world, accounted for 44% and 29.4%, respectively. Also, there are 21 papers (accounted for 61.8%) with authors belonging to universities in the US. The reason for that probably is that firms' data is more available and well organized to do research in the US.

In more detail, Table 2.2 comprises 17 papers with findings that are internal factors of firms. Those factors are also called firm-specific factors, which are all factor that belongs to firms such as firm size, net working capital, and debt to equity ratio, human resources, and ownership structure. Table 2.2 shows that before 2007, the determinants of cash holdings were discovered are financial factors such as earnings stability (Kim et al., 1998); firm size (Opler et al., 1999); cash flow volatility in financial constraint firms and unconstraint firms (Han and Qui, 2007). After that, apart from financial factors, researchers looked at non-financial factors such as CEO ownership (Chen, 2008), state ownership (Megginson et al., 2014), the natural tendencies of CEOs (Orens and Reheul, 2013), and social responsibilities (Cheung, 2016).

Table 2.2 Empirical studies with new findings of internal determinants of cash holdings

No.	Author(s)	year	Methods	Findings	Theoretical perspective	Data was obtained from	Author's affiliation
1	Kim et al.	1998	Cross-sectional and pooled time-series cross-sectional regressions.	Firms that face more unstable earnings, costly external financing, and those are having a lower rate of return on assets are likely to hold more liquid assets as an optimal response to finance future investment opportunities	The trade-off theory, contemporary trend	US	Korea, Hongkong
2	Opler et al.	1999	Time-series and cross-sectional regressions	Firms that have less access to capital markets, strong growth opportunities, riskier cash flows, and smaller size are likely to hold more cash than their counterparts are. Further, they provide little evidence that firms having excess cash increase their payouts to shareholders, new projects, and acquisitions even when these companies have poor investment opportunities	The trade-off, pecking order, and agency theories	US	USA

3	Han and Qiu	2007	The generalized method of moments (GMM)	Financially constrained firms hold more cash for precautionary savings due to an increase in cash flow volatility. In contrast, for unconstrained firms, the magnitude of cash flow volatility has no significant effect on cash holdings	The precautionary motive	US	Canada
4	Haushalter et al.	2007	Ordinary least squares (OLS) regression models	Firms with more investment opportunities have higher predation risk tend to decrease the predation by cash-rich companies and gain market share on these rival groups by holding more cash and using derivatives, especially during economic downturns	Other perspectives contemporary trends	US	USA
5	Chen	2008	OLS regressions, fixed-effect static panel, and the generalized method of moments (GMM). The effect of corporate	The GMM estimations show that CEO ownership is significantly and negatively associated with cash in old economy firms but has an insignificant effect in listed new economy firms (firms in the computer, software, Internet, telecommunications, or networking industries). The effect of board independence is not significant in old economy firms. In contrast, it is significantly positive in	The agency theory	US	Taiwan

			governance on cash holdings for listed new economy and old economy firms is examined using GMM estimations	listed new economy firms, consistent with the main argument that in new economy firms, higher levels of cash holdings are able to be allowed when boards are effective in protecting shareholder benefits			
6	D'Mello et al.	2008	OLS regression, two-stage least squares (2SLS), and full information maximum likelihood (FIML) estimation	The results indicate that for smaller firms, firms with high R&D expense ratio, low net working capital ratio, and low leverage, managers hold higher proportions of cash holdings	The trade-off theory	US	US
7	Gao et al.	2013	OLS regressions	Despite having less access to external capital, private firms hold, on average, about half as much cash as public firms do. Agency problems influence both the target level of cash and the ways managers react to cash in	The agency theory	US	Singapore, US, Canada

				excess of the target. Well-governed firms make conservative adjustments to distribute some cash to shareholders or settle their loans, leading to lower leverage. In contrast, worse governed firms tend to invest cash in other assets, leading to lower performance			
8	Orens and Reheul	2013	OLS regressions	Older CEOs and CEOs without experience in other industries are more concerned with the precautionary motive of cash rather than the opportunity cost of holding cash, leading to higher cash levels in comparison with younger CEOs and CEOs with other-industry experience. This indicates that cash holdings in Belgian privately SMEs reflect the natural tendencies of CEOs	Other perspectives contemporary trends	Belgium	Belgium
9	Megginson et al.	2014	OLS, Fixed effects, first-difference Generalized Method of Moment.	State ownership negatively affects corporate cash holdings over time in privatized Chinese firms. The higher soft budget constraint inherent in firms with high state ownership, leading to unconstrained financing as supported by state bank loans, these firms hold less cash	Other perspectives contemporary trends	China	US, Saudi Arabia

10	Liu et al.	2015	OLS regressions, three-stage least-squares (3SLS) system of equations	The excessive control rights of shareholders positively influence corporate cash holdings in Chinese family firms. This result suggests that controlling shareholders are likely to take advantage of firms' resources at minority shareholders' expense	The agency theory	China	Australia
11	Anderson and Hamadi	2016	the OLS, fixed effects, and random effects regressions	They investigate that ownership concentration positively influences liquid asset holding. On the other hand, there is no significant effect of managerial ownership on cash holdings	The precautionary motive	Belgium	UK
12	Cheung	2016	The maximum likelihood (ML) method	Corporate social responsibility is positively and significantly related to corporate cash holdings	Other perspectives contemporary trends	US	Australia
13	He and Wintoki	2016	Baseline (OLS), survivors (80s'), firm fixed effects, first differences	R&D investments explain a significant portion of the doubled increase in aggregate cash holdings of the US firms from 1980 to 2012. Furthermore, R&D-intensive	Other perspectives contemporary trends	US	US

				industries have become more sensitive to the impact of competition on their cash management policies			
14	Bakke and Gu	2017	Simulated method of moments (SMM) estimation	The authors find that diversification directly leads to a cash decrease because diversifying firms cut down savings to finance the significant investment outlays required to accumulate capital in the new industry and to lay diversification expenses. They also find that more efficient internal capital markets raise cash differences	Other perspectives contemporary trends	US	US
15	Beuselinck and Du	2017	OLS and 2SLS regressions	Headquarters reserve larger cash holdings in foreign subsidiaries with locally registered patents and foreign subsidiaries operating in the same industry with headquarters. Furthermore, subsidiaries with a board hold more cash, and this effect is greater in subsidies with the shared-industry background. Finally, when subsidiaries are led by US expatriate CEOs, the positive effect of the subsidiary's capability to innovate and to transfer knowledge on cash ratios is stronger	The agency theory	US	France

16	Breuer et al.	2017	Tobit model, OLS regression	Ambiguity aversion is significantly negatively related to cash holdings if firms are financially constrained. They interpret this finding shows that managers are not only aware of investors' preferences, but they also cater to these needs	Other perspectives contemporary trends	World	Germany
17	Chen et al.	2018	OLS and 2-stage regressions	They show the evidence that state ownership is positively related to corporate cash holdings that consistent with the agency theory	The agency theory	World	US, Canada

Table 2.3 shows a total of 17 papers that belong to the group with findings that are external factors influencing cash holdings. The external factors are factors from the outside of firms but affect cash holdings. External determinants of cash holdings were investigated, such as bank-monopoly power systems (Pinkowitz and Williamson, 2001), the financial environment (Francis et al., 2014), the quality of government (Chel et al., 2014), the cost of carry (Azar et al., 2016), the level of trust in a country (Dudley and Zhang, 2016).

Table 2.3 Empirical studies with new findings of external determinants of cash holdings

No.	Author(s)	year	Methods	Findings	Theoretical perspective	Data was obtained from	Author's affiliation
1	Pinkowitz and Williamson	2001	Time-series and cross-sectional regressions	Using the sample of Japanese firms, and in comparison, firms in the US and Germany, they investigate that firms under bank-monopoly power systems period hold more cash to provide rents for the main banks and reduce banking monitoring costs	The trade-off theory, contemporary trends	Japan, US, and Germany	USA
2	Ramírez and Tadesse	2009	Ordinary least squares (OLS) and White (1980) heteroscedasticity consistent standard errors	In countries with a higher degree of uncertainty avoidance, firms tend to reserve more cash as a way to hedge against undesired states of nature. Besides, the larger the degree of multinationality of the firm, the higher corporate cash holdings is the firm	The trade-off theory	World	US

3	Yun	2009	The differences-in-differences regression	State-level changes in takeover protection lead poorly governed firms to change in the use of lines of credit to cash holdings. Further, because of antitakeover laws and managerial discretion inside poorly governed firms, this preference for cash relative to lines of credit is stronger	The agency theory	US	US
4	Chen et al.	2012	The difference-in-differences method	As the effect of reform in China, firms with weaker governance and firms facing more financial constraints before the reform have greater reductions in cash holdings after the reform	Other perspectives contemporary trends	China	US, China
5	Iskandar-Datta and Jia	2012	They estimate the regressions each year and then take the average of the parameter estimates from annual regressions	The upward cash trend is not uniform across Canada, France, the UK, the US, and Japan. The evolution in firm characteristics necessitated the increases in cash balances. The time-varying firm attributes explain the cash trend only in Canada, France, the UK, and the US. The agency motive induces the growth in corporate cash balances in Germany. The authors highlight that the financial system is a crucial determinant that affects	The agency theory and contemporary trends	World	US

				corporate cash policy. In more detail, Australia's cash pattern is determined by shallow private credit markets that curbed cash holding earlier on, and the decelerating cash trend in Japan is attributed to financial reforms			
6	Wu et al.	2012	OLS regression, a two-stage instrumental variables regression	In regions with a more developed financial sector, Chinese firms reserve less cash to insure trade payables and have a higher substitute ratio of credit receivables for cash, especially after the new receivables policy was introduced in 2007	The agency theory	China	China
7	Huang et al.	2013	OLS regressions	Stronger investor protection settings and better accounting standards lead to lower corporate cash holdings level and vice versa	The agency theory	World	US
8	Chen et al.	2014	OLS regressions	A good government helps the local firms to relieve financial constraints because a better quality of government promotes firms' access to bank loans and trade credit. As a result, under a better quality of government, firms hold less cash	Other perspectives contemporary trends	China	China, UK, Hongkong

9	Francis et al.	2014	A generalized difference-in-difference approach	Intrastate banking deregulation has a negatively significant effect on corporate cash holdings. Financially constrained firms, especially by constrained firms with low hedging needs, drive this negative relation	Other perspectives contemporary trends	US	US
10	Yung and Nafar	2014	Cross-sectional time-series regressions	Stronger creditor rights are associated with higher levels of corporate cash holdings and lower firm value. Moreover, strong investor protections negatively affect cash retention and positively affect firm value	The agency theory	World	US
11	Chen et al.	2015	Pooled ordinary least squares (OLS)	First, in an international setting, while individualism has a negative relation with corporate cash holdings, uncertainty-avoidance is positively associated with cash holdings. Second, individualism and uncertainty avoidance influence the precautionary motive for holding cash. Third, firms in individualistic states in the United States reserve less cash than firms in collectivistic states. Fourth, the authors investigate that individualism is positively associated with the firm's	The agency theory	World and the US	Australia, US, India

				capital expenditures, acquisitions, and repurchases, while uncertainty avoidance is negatively related			
12	Ghaly et al.	2015	OLS regressions, Fama–MacBeth regression, Two-stage least squares regressions	Firms with strong commitments to employee well-being are likely to hold more cash, especially in highly competitive industries, human-capital-intensive firms	Other perspectives contemporary trends	US	UK
13	Qiu and Wan	2015	Pooled OLS regression with fixed effects estimates	Technology spillover and market competition are positively associated with corporate cash holdings	Other perspectives contemporary trends	US	Canada, US
14	Azar et al.	2016	time-series regressions, cross-sectional identification, difference-in-	They provide evidence that changes in the cost of carry are an important factor of the long-run changes in cash holdings by firms in the US. They investigate a large negative effect of cost and carry on the cash to assets ratio. Besides, they document that differences in cost of	Other perspectives contemporary trends	US	US

			differences techniques	carry also explain cross-country differences of cash to assets ratios in the five largest European and Japan and help explain within-country time variation of corporate cash holdings	contemporary trends		
15	Dudley and Zhang	2016	OLS regressions at the firm-year level	Firms in countries with high levels of trust hold more cash than firms in countries with low levels of trust, especially because of shareholders' beliefs about corporate insiders' behavior	The agency theory	World	Canada
16	Smith	2016	OLS regressions	Firms tend to protect their assets and financial policies from rent-seeking by decreasing liquidity and increasing leverage to limit expropriation by corrupt public officials	The agency theory	US	US
17	Xu et al.	2016	OLS regressions	The political uncertainty created by government official turnover negatively affect corporate cash holding behavior	The agency theory, contemporary trends	China	China, US

2.4. Cash for transaction purpose and short-term financial investments

Firms keep cash holdings and other liquid assets not only for transaction purposes but also for precautionary and speculative purposes. Therefore, managers have to determine the proportion of each type of cash to manage liquidity efficiently. For example, a firm has $ 1 million cash holdings and their cash demand for transactions in a month is $600,000. They can hold a total of $ 1 million in the type of non-interest-bearing cash or just hold enough for transaction needs, and the rest of cash holdings they can invest in short-term financial investments such as time deposits or bonds or stocks.

2.4.1. The cash demand for transactions

Recently firms keep a higher proportion of liquid assets to total assets (Azar et al. 2016). Firms need an answer to the question that is how much firms should invest in real cash for transactions to manage their liquid assets effectively, reducing the cost of carrying liquid assets by investing idle cash in short-term financial instruments. Over the years, researchers tried to build models to calculate the optimal non-interest-bearing cash or real cash level for a company, which can be used for business transactions immediately. The first model was introduced by Baumol (1952) based on the model of economic order quantity in inventory management. Accordingly, the optimal real cash balance is determined as the equation below:

$$C^* = \sqrt{\frac{2bT}{i}} \qquad (1)$$

Where:

- b is a fixed transaction cost of cash replenishment by selling securities or withdrawal;
- T is total real cash that is estimated to be paid out in a certain period; and
- i is the opportunity cost of holding real cash that is the rate of return on short-term financial tools

However, firms only use this equation when they satisfy the assumptions of the model:

- Total real cash outflows T is a steady stream and no real cash reserve for safety purpose

- Throughout the period, there is no receipt, money is replenished by borrowing or selling marketable securities, and the fee for these transactions is similar.

So, as in his paper, Baumol said that "the majority of the public will find it impractical and perhaps pointless to effect every possible economy in the use of cash" (Baumol, 1952, p. 553). It can be seen that this model could not be applied in real business to determine how much real cash a company should keep on hand. This model, however, can be used in different aspects such as: the greater the opportunity cost of holding cash; the lower amount of real cash; the higher the transaction cost b, the larger is the real cash balance and vice versa.

Baumol's model was developed by Miller and Orr (1966) that can be applied in business. In Miller and Orr (1966) model, real cash is allowed to randomly move into and out of a firm. In this model, Miller and Orr assumed that:

- Firms have a "two-asset" setting, one is real cash, and the other is a portfolio of cash equivalents whose daily average return is r dollar;

- Transaction costs (f) are fixed for active buying and selling marketable securities.

- Real cash level is allowed to change freely between the two control limits, which are the upper limit (U^*) and lower limit (L)
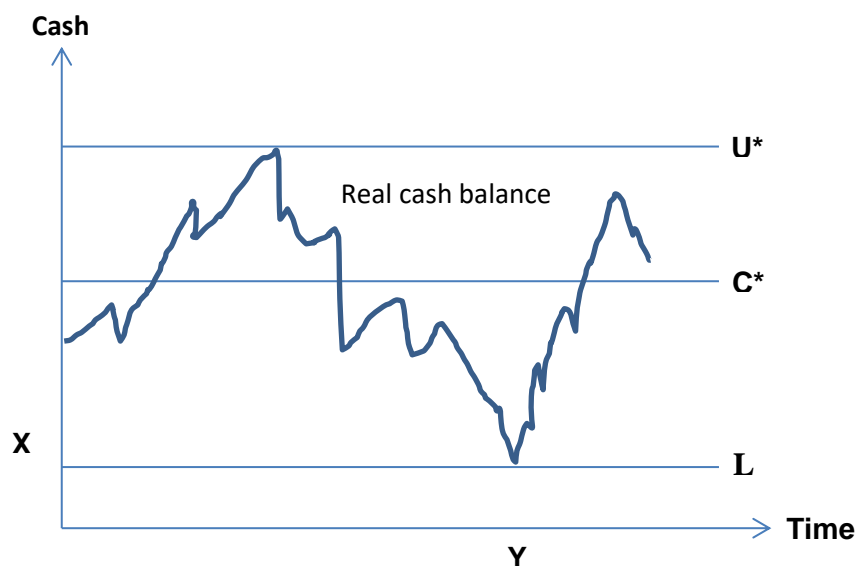

Figure 2.1. Real cash balances as of the Miller-Orr's model.

Figure 2.1. illustrates how Miller-Orr's model works. When the real cash reserve attains the upper limit (such as at point X), marketable securities will be purchased in the total of (U*- C*). By contrast, when it crashes the lower limit (as at point Y), marketable securities will be sold to replenish (C*- L). In both cases, these actions help restore the optimal real cash level (C*).

To apply this model, firstly, firms set the minimum real cash balance (L), which is kept for the safety purpose. Then, based on the distribution of cash flows in the past, firms determine the variance σ^2 of historical net cash flows. Finally, the real cash balance that firms should keep minimizing the total cost of holding real cash is determined as the formula below:

$$C^* = L + \left(\frac{3f}{4r}\sigma^2\right)^{1/3} \tag{2}$$

$$U^* = 3C^*-2L \tag{3}$$

$$\text{Average cash balance} = (4 \times C^*-L)/3 \tag{4}$$

This model seems to be effectively used to manage cash for firms with operations that are not too complicated; determining the minimum real cash L and variance σ^2 would be easier. Satisfying all the model's assumptions, such as fixed transaction costs, rarely happens in practice. Thus, the applicability of this model in business practice is still limited. Despite this, companies are able to use the ideas of this model, like determining a safe level of real cash L, statistically tracking and calculating the level of real cash flow fluctuations to take measures for cash holdings management.

Models based on transaction demand like Baumol (1952), Miller and Orr (1966) have not taken the line of credits into account. Sastry (1970) suggests a model that allows firms to use a line of credit with the cost of u per money unit per day of real cash balance deficit. This model is based on the assumptions of Baumol's model. Thus, it still has two serious drawbacks: one-way cash transactions and a constant and deterministic environment assumption (Gregory, 1976).

2.4.2. Invest idle cash in short-term financial assets

The investment of idle cash (cash is not spent immediately) in short-term financial assets is another important of cash holdings managements (Gitman et al., 1979). Because these investments have

rates of return, they contain the risks. But models to determine the cash demand for transactions do not model the risk or illiquidity of firms' financial assets. Therefore, Duchin et al. (2017) suggest a model of a firm's demand for risky or illiquid financial assets. The model is a parsimonious representation of a dynamic problem in which the firm has both present and future real investment projects and in which the firm has limited access to external finance. The main innovation in the model is allowing firms to invest in a range of financial assets, which include liquid and illiquid assets as well as safe and risky assets.

The model provides several predictions. First, for financially constrained firms, investing in illiquid or risky financial assets is suboptimal. Second, financially unconstrained firms benefit from having access to illiquid financial assets and are at best indifferent to investing in risky financial assets. Third, firms with agency problems or managerial overconfidence are likely to invest more in risky financial assets. Fourth, there are no uniform tax incentives to invest in risky financial assets (Duchin et al., 2017).

Gitman et al. (1979) conducted a survey including the top 150 and bottom 150 firms on the Fortune list of 1000 largest firms to access the practice of cash management. They find that the larger and smaller firms owned similar types of securities, there are a few differences. First, larger firms tend to hold more types of short-term financial investments than smaller firms. Second, larger firms are much more likely to invest in foreign short-term securities in their portfolios. Third, larger firms ranked maturity higher than yield when selecting the securities to hold.

Azar et al. (2016) document that the liquid assets of US firms increase twofold since 1980. Specifically, firms held a higher proportion of short-term financial assets in their liquid assets portfolios. The fraction of short-term financial assets in total liquid assets in 1980 was 40%, but this ratio climbed significantly up to about 80% in 2010. This upward trend for short-term financial investments of US firms over time results from the decrease in transaction costs, combined with the relaxation of constraints on corporate liquid assets portfolio. Because of the variety of securities on the US's financial market, firms can diversify their liquid asset portfolio with many types of liquid assets, ranging from

currency to money market mutual funds. Notably, according to Duchin et al. (2017), at least 23.2% of

the total liquid assets of US firms comprise risky financial assets.

CHAPTER 3. CORPORATE CASH HOLDINGS AND AGENCY PROBLEM: EVIDENCE FROM VIETNAM

3.1. Introduction

Cash is an indispensable factor for setting up and running a business smoothly. With sufficient cash reserves, a company does not only have to be fixated on finding sources of cash in any possible way but also allows the manager to seize the opportunities on the market that make a breakthrough development. Therefore, studies on cash holdings have been concerned and carried out in developed countries since the 1950s with studies on building a model of the demand for money by firms (Baumol, 1952; Miller and Orr, 1966). Then, in the late 1990s, researchers have carried out empirical studies on the determinants of cash holdings such as Kim et al. (1998), Opler et al. (1999), Ozkan and Ozkan (2004), Bates et al. (2009), and Bigelli and Sánchez-Vidal (2012).

In recent studies, researchers are interested in the relationship between state ownership and cash holdings. However, both theories and empirical evidence still show conflicting results. State ownership is associated with agency problems and poor corporate governance (Shleifer and Vishny, 1994; Megginson and Netter, 2001; Megginson et al., 2014) because managers are typically entrenched bureaucrats, less subject to pressures from the stock, product, or labor markets, and less internally monitored by individual shareholders (Chen et al., 2018). Therefore, high state ownership leads to more severe agency problems. Agency problems lead to high cash holdings (Jensen, 1986; Opler et al., 1999). Using a sample of newly privatized firms from 59 countries, Chen et al. (2018) provide evidence about the positive relation between state ownerships and corporate cash holdings, consistent with agency theory. In contrast, the soft budget constraint theory suggests that the transaction cost and precautionary motives should be less for state-owned enterprises (SOEs)[1] because of being able to raise external funds at a lower cost, hence SOEs hold less cash. For a sample of Chinese listed firms, Megginson et al. (2014) document that state ownership is negatively associated with corporate cash holdings.

Taken together, the effect of state ownership on cash holdings is still an empirical question.

Hence, the first objective of this chapter is to shed the light on the potential relation between state ownership and corporate cash holdings in Vietnam. Second, I examine how cash holdings change as the effect of being exposed to the stock market by the time since equitization. The number of firms and the timing of equitization in Vietnam provide us an interesting research circumstance where I analyze the relationship between cash holdings and recently equitized firms. Since the early 1990s, the Vietnamese government performed equitization program in order to improve the efficiency of former SOEs and decrease the burden on the government budget; to force the non-strategic sectors of state to compete with the private sector; to closely associate equitization with the capital market and the securities market development (Abonyi, 2005; Art. 1, Decree 187 from 2004). Transformed into public companies and listed, firms must comply with many requirements on information disclosure that anyone can access, such as submission of quarterly, semi-annual, and annual financial statements on time. Information disclosure rules help to improve the transparency of Vietnam's stock market, reduce the degree of information asymmetry and agency problems in equitized firms compared to former SOEs. Therefore, firms with a longer history of capital market transactions would have a better reputation as well as an improvement in the amount of information the markets have about such firms, which helps firms easier to access external capital when needed, therefore reducing their demand for cash. As a result, cash holdings should be negatively associated with age after equitization, and the positive effect of state ownership (if any) should be weakened by the time.

Financial information and state ownership ratios of non-financial listed firms on the Ho Chi Minh Stock Exchange (HOSE) and the Hanoi Stock Exchange (HNX) over eight years (2010-2017) are used for analysis. Our regression results show that state ownership ratio positively impacts cash holdings according to agency theory, confirming the result by Chen et al. (2018).

The contribution in this chapter is the new evidence that cash holdings are related to the age after equitization in the context of SOEs. This evidence is new in the corporate finance literature and makes this finding different from the existing studies. In particular, the regression results show a negative relation between firm age from equitization (firm age, henceforth) and cash holdings. Furthermore, the negative coefficients of the interaction term between firm age and state ownership

ratio prove that the effect of state ownership diminishes as time passes after equitization. Besides, unlike findings by Megginson et al. (2014), this chapter shows evidence that there is no evidence for soft-budget constraint theory by providing the regression results that the coefficients of the interaction term between state ownership ratio and bank debt are negative and significant.

Apart from shedding the light that agency theory is dominant to explain corporate cash holdings by Vietnamese listed firms, this detection supports the view that agency problems are likely to exist in firms invested by the Government. Therefore, these firms need to have a good governance practice to mitigate agency problems. The disclosure, transparency of information is a useful way of reducing agency issues.

3.2. Literature reviews, the economic and financial system of Vietnam and hypothesis development

3.2.1. The literature on state ownership

It is said that SOEs are usually less efficient or, at least, less profitable than privately owned enterprises. Shleifer and Vishny (1994) argue that the inefficiency of SOEs is the result of political pressures from the politicians who control them. Politicians acting on their political goals may take on politically expedient projects, as opposed to the NPV maximization mission (Megginson et al., 2014). Another primary source of the inefficiency of SOEs stems from less-prosperous firms being allowed to rely on the state for capital supplying, leading to soft-budget constraints (Megginson and Netter, 2001). Besides, SOEs tend to use more debt than private firms because most SOEs (except for those are privatized) cannot sell equity to private investors, but they easily borrow at favorable rates (Dewenter and Malatesta, 2001).

Privatization-that is defined as the intentional sale of SOEs or other state-owned assets to the private sector-has spread around the world as the result of the disappointment of states with the underperformance of SOEs. This is a legitimate-often a core-tool of statecraft by governments of more than 100 countries (Megginson and Netter, 2001). The modern privatization started in the early 1980s

in the UK, and privatized firms were broadly recognized as being more efficiently run after divestiture. The success of privatization in the UK convinced many other countries to launch the sale of SOEs through public offerings. Privatization through share issues was performed by Denmark, Italy, Malaysia, and Singapore in 1985; in France, Australia, Belgium, the Netherlands, Jamaica, Japan, Spain, Sweden, and the US and in during late 1986 and 1987. Then privatization programs spread rapidly to the developing countries of South America, Africa, and South Asia, mostly through private sales. In the 1990s, the privatization waves shifted to communist countries such as Eastern Europe and the former Soviet Union, China, and Vietnam. Regardless of their ideological basis, the objectives of privatization are raising revenue for the state, promoting economic efficiency, decreasing government interference in the economy, promoting wider share ownerships, providing the opportunity to introduce competition, and exposing SOEs to market discipline (Megginson et al., 1994; Megginson and Netter, 2001).

As systematically reviewed by Megginson and Netter (2001), privatization works in the sense that almost privatized firms become more efficient, more profitable, and financially healthier, and increase their capital investment spending for both transition and non-transition economies. Megginson et al. (1994) document economically and statistically significant increases in output, operating efficiency, profitability, capital spending, and dividend, coupled with a significant reduction in leverage for a sample of 61 firms from 18 non-transition countries after privatization. Notably, they provide evidence that during their research span of the -3 to + 3-year period surrounding privatization, SOEs were rarely subsidized while they were being prepared for privatization, and after divestment, there were no subsidies for privatized firms. Also, Boubakri and Cosset (1998) used a data set of 79 firms from 21 developing countries and 32 industries over 1980–1992 and confirm that following privatization, the increases in real sales (output), profitability, efficiency (sales per employee), and capital spending, dividend payment coupled with significant declines in leverage.

Similarly, the positive effects of privatization were reported in almost all cases in transition economies like Eastern Europe and the former Soviet Union (Megginson and Netter, 2001). However, some other notable points about privatizations in those countries are the number of firms privatized in

some way in transition is much greater than in non-transition economies, and the results of privatizations depend on the structure of ownership.

Privatization in China differs from privatizations used in market economies or the mass privatizations executed in Central and Eastern Europe, Russia, or Mongolia (Sun and Tong, 2003). The reform in China has progressed without wholly market liberalization or democratization. Regarding share issuing privatization in China, there are six types of shares according to China's laws, which are state, legal person (also called institutional), foreign, management, employee, and individual shares (Chen et al., 2009). Using state ownership measured as the fraction of state shares, Sun and Tong (2003), Wei et al. (2005) document that firm performance is negatively related to state ownership in privatized firms. Chen et al. (2009), however, argue that legal person shares can be owned by a number of assorted entities, ranging from merely SOEs to private firms, and state shares can be owned by different types of state-shareholders (such as the state asset management bureaus, central SOEs, local state). Thus, using state shares fraction as a proxy for state ownership may distort the results and leads to inaccurate conclusions. Chen et al. (2009) divided listed firms into those controlled by state asset management bureaus (SAMBs), SOEs affiliated to the central Government (SOECGs), SOEs affiliated to the local government (SOELGs) and private investors. Chen et al. (2009) find that SOECG controlled firms are the best, SAMB and private controlled firms are the worst, and SOELG controlled firms are in the middle in a term of operating performance.

3.2.2. The literature on the effects of state ownership on cash holdings

3.2.2.1. The agency theory

Prior studies have shown that in many cases, agency problems are a common phenomenon in state-owned enterprises. Chen et al. (2018) state that managers of SOEs are typically entrenched bureaucrats leading to more severe agency problems. SOEs belong to the public but are under the control of politicians. Therefore, there is no strong incentive for individuals to monitor managerial behavior (Vickers and Yarrow, 1991). The mechanisms for monitoring the performance results of SOEs are

usually performed by executive government agencies. Monitoring, however, basically degrades into an inefficient bureaucratic pyramid of multi-level administrative control and perfunctory reports (Abramov et al., 2017). Furthermore, the objective of SOEs is usually not profit maximization but is related to such kind of things such as redistribution to favored interest groups, employment levels, patronage, and so on (Vickers and Yarrow, 1991). SOEs' managers, therefore, are evaluated by the achievement of political goals and are less subject to pressures from the stock, product, or labor markets (Chen et al., 2018). Both internal monitoring and external corporate governance mechanisms are weak; managers of SOEs have incentives to consume private benefits.

The previously cited literature suggests that high state ownership is associated with weaker monitoring by non-state shareholders or outsiders, serious information asymmetry, and more agency problems. Therefore, according to this agency theory, firms with high residual state ownership hold more cash. Consistent with this view, Chen et al. (2018) find that state ownership is positively related to corporate cash holdings. Also, they find that privatized state-controlled firms or politically connected firms hold more cash than their counterparts. Similarly, for the sample of listed firms in China, Kusnadi et al. (2015) show evidence that state-controlled firms hold more cash than non-state-controlled firms.

3.2.2.2. The soft-budget constraint theory

János Kornai formulated the soft-budget constraint (SBC) theory by observing the phenomenon that the chronic loss-making Hungarian state-owned enterprises were never allowed to go bankrupt during that country's experiment with market reforms (Kornai, 1979, 1980). These firms were always saved or bailout of financial difficulties by government subsidies or other instruments.

Regarding equitized SOEs, Anderson et al. (2000) show that when the central Government retains ownership in equitized firms, more than two-thirds of firms still have soft budget constraints. Furthermore, Frydman et al. (2000) investigate performance differences between privatized firms controlled by outsiders and those controlled by governments and argue that in comparison with

privatized firms, state banks and tax authorities significantly show softer imposing financial discipline on state firms than on their privatized firms.

Related to cash holdings, based on SBC theory, Megginson et al. (2014) argue that state ownership is inherently connected with soft-budget constraints: the higher the state ownership, the softer the budget constraint, or the less financially constrained is the firm. Financially unconstrained firms hold less cash, so it is expected the negative relation between cash holdings and state ownership. Consistent with this argument, they provide evidence from a sample of Chinese listed firms that state ownership is negatively associated with corporate cash holdings.

3.2.3. Some aspects of Vietnam's economy

3.2.3.1. A short description of the Economy of Vietnam

In Vietnam, the only legal and ruling party is the Communist Party of Vietnam (CPV), which sets out all directions and policies for the socio-economic development of Vietnam. In the period 1975-1985: after the Vietnam War, Vietnam followed a centralized bureaucratic management mechanism, with two main types of firms: state-owned and collective enterprises. There was virtually no private business or foreign direct investment. The economy experienced a big crisis with the annual inflation rate higher than 700%; exports were less than half of imports; budget resources were strained by high military expenditures and support for loss-making SOEs (Abonyi, 2005).

In 1986, The Sixth National Congress approved the Doi Moi Program that eradicates the system of bureaucratic centralized management based on state subsidies; and to move to a multi-sector, market-oriented economy with a role for the private sector to compete with the state in non-strategic sectors. Doi Moi program combined government planning with free-market incentives and encouraged the establishment of private firms and foreign investment, including foreign-owned enterprises. The Law on Foreign Investment enacted in 1988, allowed foreign investments in Vietnam. The Law on Companies and the Law on Private Enterprise in 1990 provided an important basis for the establishment and operations of private firms (Abonyi, 2005).

The most notable point is that Vietnam has only really escaped the influence of the war since February 3, 1994, when the US lifted the economic sanctions against Vietnam. It took nearly 20 years after the reunification of the country to be able to normally do business with the world. This event boosted the development and competition in Vietnam. The year 1994 and 1995 witnessed growth rates of 9.54% and 9.34%, the highest growth rate of Vietnam after the Vietnam War (Figure 3.1.). From 2000 to 2017, Vietnam's economy has grown stably with a rate of around 6-7% per year.
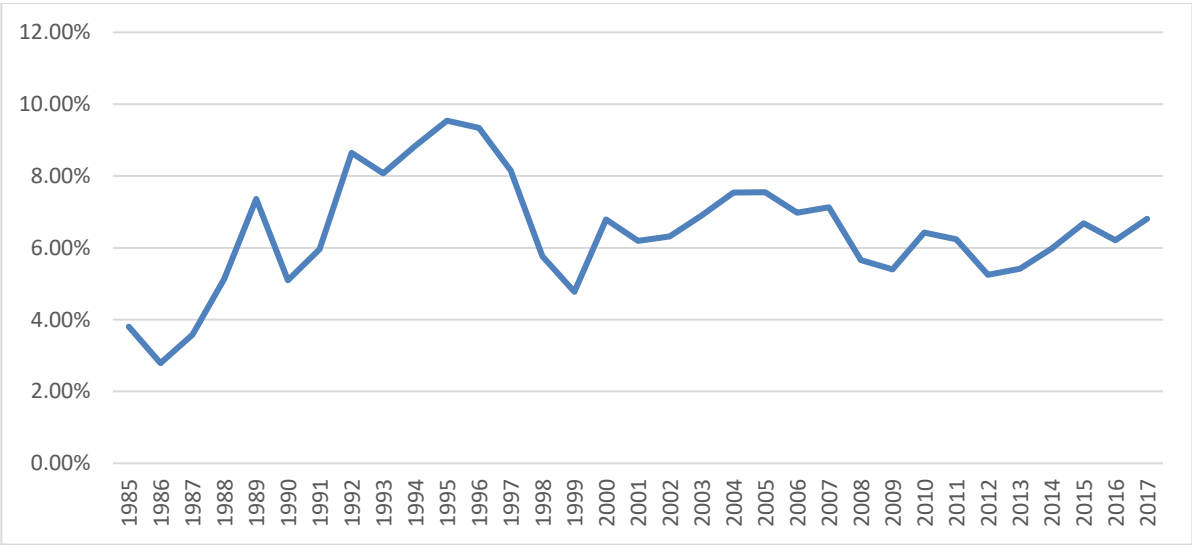
Figure 3.1. The annual GDP growth rate of Vietnam 1990-2017. Source: The World Bank Group's database

3.2.3.2. The financial market in Vietnam

1) The bank market

During the centrally planned economy period from 1975 to 1986, virtually no financial market had existed. In 1988-1989, the Vietnamese banking system transformed into a two-tier banking system. There has been a significant increase in the number of financial intermediaries, including commercial banks and non-bank institutions, since then. Nevertheless, Vietnam demonstrates specific features of a bank-based financial system where banks are dominant players (Nguyen et al., 2018).

Although joint-stock commercial banks increased their numbers immediately after their appearance in 1990 (in 2009, there were 37 joint-stock commercial banks), the leading positions in the market still belong to five state-owned commercial banks with extended networks in almost all provinces and larger cities. Those state-owned commercial banks were originally sector departments under the State Bank of Vietnam, with specified lending programs to state-owned enterprises, which were based on government policies.

2) The securities market

Vietnam stock market (VSM) was officially put into operation on July 28th, 2000. After more than 16 years, a significant and speedy expansion in terms of VSM scale has opened up a long-term capital mobilization and a new investment channel for the economy. By the end of 2015, Vietnam's stock market had 686 listed companies and listed investment funds. The total capitalization of the stock market is equal to 34.5% of GDP in 2015 (Nguyen and Nguyen, 2016).

Despite the remarkable development of the financial market, Vietnam's bond market is still small. Especially, the growth of the corporate bond sector is really limited. Based on financial information disclosed by listed firms on HOSE and HNX, bank loans are dominant. In particular, banks provided 70-80% of the total long-term loans of firms, whereas loans from corporate bonds just accounted for 14-20% of total long-term loans. The number of firms that have capital from issuing bonds is small, around 20 firms over 686 listed firms over the period 2010-2017.

3) The equitization of state-owned enterprises

In the centrally planned period, the Government managed the economy mainly by administrative orders. SOEs operated based on the orders of the authorities. The Government allocated capital and materials, labors to enterprises, and enterprises gave all products to the State. In the case of making losses (profits), the Government would cover all losses (collects).

After the Sixth National Congress of the Communist Party of Vietnam in 1986, the first legal provisions-Decree 217 in 1987-for SOEs reform was enacted to improve SOEs' governance and to steer them more towards market activities. This law abandoned the regime of allocating supplies, delivering products, and implemented the regime of purchasing supplies and selling products according to economic contracts. However, SOEs were still under the control of the ministries or provincial Government. Therefore, SOEs did not face the disciplinary effects of the market and the threat of takeover like private firms do. Gainsborough (2002) argues that SOEs had a long tradition of behaving in non-sanctioned ways. Besides, management in SOEs was appointed on the basis of political decisions with salaries and job security not related to economic performance. With such a governance system, SOEs run ineffectively; therefore, the Government stepped towards equitization. SOEs were transformed into joint-stock companies, and the state reduced their ownership ratio by selling a proportion of state shares in the enterprise, and employees were given preferential access to such shares. The purposes of SOE equitization were to create a new type of enterprise with diversified owners to strengthen the performance of SOEs; to lead to more efficient use of state assets at the same time decrease the burden on government budget; and to mobilize capital in the new types of SOEs (Abonyi, 2005).

A pilot equitization program during the 1992–1996 period focused on equitizing several small and medium-sized SOEs in non-strategic business areas, but only five SOEs were equitized. After that, the bolder reform was carried out towards the entire small and medium-sized enterprises. As a result, twenty-five SOEs were equitized over the period of 1996-1998. In the next step, the Government classified SOEs into three groups according to their level of importance, and equitization gained momentum: 845 SOEs were equitized between 1998 and 2002. The equitization took place more aggressively when the State determined there is no need to hold 100% capital in many firms, as well as the option of liquidating some of them. Consequently, 1,292 SOEs were equitized from 2002 to 2004. By February 2008, the State had equitized around 4,000 SOEs. Most equitized enterprises were small, and basically, no equitization of large SOEs was executed (Wacker, 2017).

According to Abonyi (2005), the number of SOEs is around 12,300 by 1990-1991. In 2017, this number had been reduced dramatically to 2,486, and there were 1,167 joint-stock companies having state ownership under 50%, making up a total of 3,653 firms that have state ownership, accounted for only 0.65% of total enterprises (GSO, 2018). However, these firms are much larger and more capital-intensive than non-state capital firms (GSO, 2018).

Equitization in Vietnam also had positive impacts on privatized and equitized firms' performance. O'Toole et al. (2016) used a rich data set of 23,120 observations with 15,990 observations for private and 7130 observations for SOEs. O'Toole et al. (2016) document that privatized firms and equitized firms with state ownership below 50% show a positive relationship between the fundamental Q[2] and investment suggesting efficiency in capital allocation. But they also found no significant relationship between Q and investment for SOEs.

3.2.4. Hypothesis development

As already mentioned in the literature review section, poor corporate governance and more severe agency problems are inherent in state ownership. Therefore, according to agency theory, state ownership positively impacts cash holdings. In contrast, according to the soft budget constraint theory, high state ownership is associated with less cash holdings. However, most listed SOEs in Vietnam were equitized before 2008, belonging to non-strategic segments of the Government. Especially, the Vietnamese Government equitized these firms in order to improve the efficiency of former SOEs, reduce the burden on the Government's budget, and promote the development of the capital market and the securities market of Vietnam (Abonyi, 2005; Art. 1, Decree 187 from 2004). Taken together, these imply that the majority of listed Vietnamese firms do not have the soft budget constraints. This discussion leads to my first hypothesis about the relation between cash holdings and state ownership based on agency theory.

Hypothesis 1: State ownership positively affects cash holdings.

After confirming that agency theory is dominant for Vietnamese firms, I argue that as firm age increases, cash holdings decrease due to a better reputation and an improvement in the amount of information the market has about such firms. Faulkender (2002) argues that firm age can affect cash holdings because the firm age is associated with the degree of information asymmetry between the firm and capital markets. In more detail, along with an increase in firm age, firms have a longer history of capital market transactions as well as successful operations. Therefore, ceteris paribus, firm age brings about a better reputation and an improvement in the amount of information the markets have about such firms. For equitized listed firms in Vietnam, investors only have information about these firms since equitization because when firms are 100% state-owned, they just provide the information about their business activities and performances to the Government only. Therefore, I apply the argument of Faulkender (2002) to the age from equitization and consider that older firms should receive a lower marginal benefit from cash, as raising external funds when needed should be easier, therefore lowering their cash holdings level. Hence, I hypothesize below my main Hypothesis 2. Even if controlling state ownership, age from equitization, i.e., the number of years after an SOE is equitized, is negatively associated with cash.

Hypothesis 2: Age from equitization is negatively related to cash holdings.

As the third hypothesis, it is interesting to see the cross-term of state ownership and age. The higher firm age gives a firm a better reputation and decreases the information asymmetry, which helps to mitigate the agency problems because of state ownership. Therefore, I argue that given the level of state ownership, the positive effect of state ownership on cash holdings becomes weaker as the year passes after being equitized. In other words, the interaction between age and state ownership is expected to affect cash holdings negatively as the third hypothesis below:

Hypothesis 3: The effect of state ownership on cash holdings diminishes as age from equitization becomes older.

The previous studies have not examined these two hypotheses yet regarding the relationship between cash holdings and the age after equitization.

3.3. Data

3.3.1. Characteristics of the sample

From 2010 to 2014, some equitized firms did not disclose information about state ownership, and since 2015 some state-owned economic groups have been equitized with high residual state ownership. If the sample includes these firms, the mean of state ownership ratio might yearly increase in the research period and show the wrong trend of reducing state ownership by the Government. Therefore, to evaluate the yearly changes of state ownership and cash ratio, all firms that have not full financial and state ownership information for analysis are excluded. Finally, the sample for this research is a strong, balanced panel dataset, including 233 non-financial Vietnamese listed firms (of them, 140 firms are listed on HSX, and 93 firms are listed on HOSE) covering eight years from 2010 to 2017, leading to an aggregate sample of 1864 firm-year observations. These enterprises are classified into 14 supersectors[3] (under the Industry Classification Benchmark), which are oil and gas, chemicals, basic resources, construction and materials, industrial goods and services, automobiles and parts, food and beverage, personal and household goods, health care, retail, media, travel and leisure, utilities and technology.

In these 233 listed firms, there are 180 firms[4] (accounted for 77.25%) that used to be 100% SOEs, and there are six firms established with more than 50% state-owned capital (accounted for 2.58%), the others 47 firms (20.17%) are private firms and joint-stock companies with state ownership below 50%. By the end of 2010, the state had divested 22 equitized firms. There were 170 listed firms that had state-owned capital (of them, 158 firms were former 100% SOEs), and 63 firms totally private at the end of 2010. From 2010 to 2017, the state continued selling all their stakes in 35 firms, then there were 135 firms that had state-owned capital (of them, 123 firms were former 100% SOEs), accounted for roughly 58 % and 98 firms totally private, accounted for 42% in total firms of the sample at the end of 2017. The number of firms with state ownership greater than 50% in 2010 and 2017 were 53 (accounted for 22.75%) and 52 (accounted for 22.32%).

3.3.2. Measurement of variables

The data used in this chapter is provided by FIINGROUP Joint-stock company (previously as StoxPlus Joint Stock Company), except for the year of equitization is self-collected from profiles of listed firms on the website http://cafef.vn/. Financial variables are calculated based on yearly audited financial statements over the 2010-2017 period of the Vietnamese non-financial listed firms on the Hanoi Stock Exchange (HNX) and Ho Chi Minh Stock Exchange (HOSE).

Table 3.1 The definitions of the variables used in Chapter 3

Variable	Definition
CASH	The ratio of the total amount of cash and cash equivalents to total assets
STATE	It is a proxy for state ownership ratio in a firm
STATE_D	Equals one if state ownership ratio greater than zero and zero otherwise
AGE	The year t minuses the year of equitization
SIZE	The natural log of total assets
GROWTH	The sales' yearly growth rate
CFLOW	The ratio of net cash flow from operation to total assets
NWC	The ratio of current assets minus current liabilities minus cash and cash equivalents, divided by total assets
FAR	Fixed assets to total assets ratio
LEV	The ratio of total debt to total assets
BANKDEBT	The ratio of the sum of short-term loans and long-term loans to total debt
DVD	Equals one if a firm pays cash dividends, and zero otherwise

The term "cash" or cash holdings means the amount of cash and cash equivalents. Variables are defined as Table 3.1 CASH is the ratio of the total amount of cash and cash equivalents to total assets. STATE is state ownership ratio in a firm[5]. STATE_D equals one if the state ownership ratio greater

than zero and zero otherwise. AGE is the year t minuses the year of equitization. SIZE is the natural log of total assets. GROWTH is the sales' yearly growth rate. CFLOW is the ratio of net cash flow from operation to total assets. NWC is the ratio of current assets minus current liabilities minus cash and cash equivalents, divided by total assets. FAR is fixed assets to total assets ratio. LEV is the ratio of total debt to total assets. BANKDEBT is the ratio of the sum of short-term loans and long-term loans to total debt. DVD is a proxy for dividend payment and equals one if a firm pays cash dividends and zero otherwise.

3.3.3. Summary statistics

Table 3.2 presents summary statistics, including the mean, four quartiles, and the standard deviation of variables. The table shows that the average cash holdings to total assets ratio of Vietnamese listed firms is 9.8 %, which is almost the same as the average cash holdings ratio in previous studies in Vietnam. Specifically, the mean of cash ratio of big firms listed on the Ho Chi Minh Stock Exchange (HOSE) and listed firms on both stock exchanges in Vietnam are 9.6 % (Vo, 2017) and 9.7 % (Nguyen et al., 2016), respectively. With the same measurement, Ozkan and Ozkan (2004) report the mean and median of cash holdings in the UK from 1995-1998 are 9.9% and 5.9%; Kim et al. (1998) report that the mean and median values of the cash ratio in the US are 8.1% and 4.7% respectively which are just about similar with my research results (9.8% and 5.9% in that order).

As shown in Table 3.2, the average state ownership ratio for my sample of firms is 25.3% (the median is 21.1%). The average firm age (AGE) is 9.676 years. The mean of SIZE is 26.911, which means the average firm has total assets of 1480 billion VND. Firms in my sample have an average yearly sales growth rate (GROWTH)[6] of 35.8%. The average operating cash flow to total assets (CFLOW) of firms is 5.1%. The means of networking capital to total assets (NWC) and fixed assets to total assets (FAR) ratios are 10.2% and 26%, respectively. The average debt ratio (LEV) is 51.5%, which is similar to a research for the 2006-2009 period by Okuda and Nhung (2012) with the value of

50.4% and slightly higher[7] than the numbers reported by Toan Luu and Tran Bao (2017) with the ratio of 46.3%. Firms in my sample have a bank debt to total debt ratio of 42.9% on average. Finally, 79% of observations have dividend payments.

Table 3.2 Summary statistics of variables

Variable	Number of Obs.	Mean	25%	Median	75%	Std. Dev
CASH	1864	0.098	0.023	0.059	0.136	0.112
STATE	1864	0.253	0	0.211	0.501	0.231
AGE	1864	9.676	7	10	12	3.593
SIZE	1864	26.911	25.981	26.841	27.943	1.483
GROWTH	1864	0.358	-0.054	0.083	0.238	6.437
CFLOW	1864	0.051	-0.025	0.043	0.120	0.148
NWC	1864	0.102	-0.024	0.082	0.215	0.197
FAR	1864	0.260	0.010	0.209	0.377	0.203
LEV	1864	0.515	0.343	0.552	0.689	0.223
BANKDEBT	1864	0.429	0.193	0.460	0.668	0.283
DVD	1864	0.790	1	1	1	0.408

(Note) See Table 3.1 for the definition of variables. The sample includes equitized listed SOEs and listed non-SOEs for the period from 2010 to 2017. The number of firms for each year is 233.

3.4. The determinants of cash holdings

3.4.1. A snapshot of cash holdings and state ownership

The time trends of the mean of cash ratio and the mean of state ownership are demonstrated in Figure 3.2. The Figure shows that from 2010 to 2017, both state ownership and cash ratio slightly decreased. The average state ownership ratio was 26% in 2010, then except for an increase in 2012,

average state ownership annually gradually reduced to 22% in 2017. The mean of cash ratio declined by approximately 2% from 10.3% in 2010 to 8.3% in 2017, but from 2010 to 2015, the cash ratio slightly fluctuated around 10% to 10.5%.
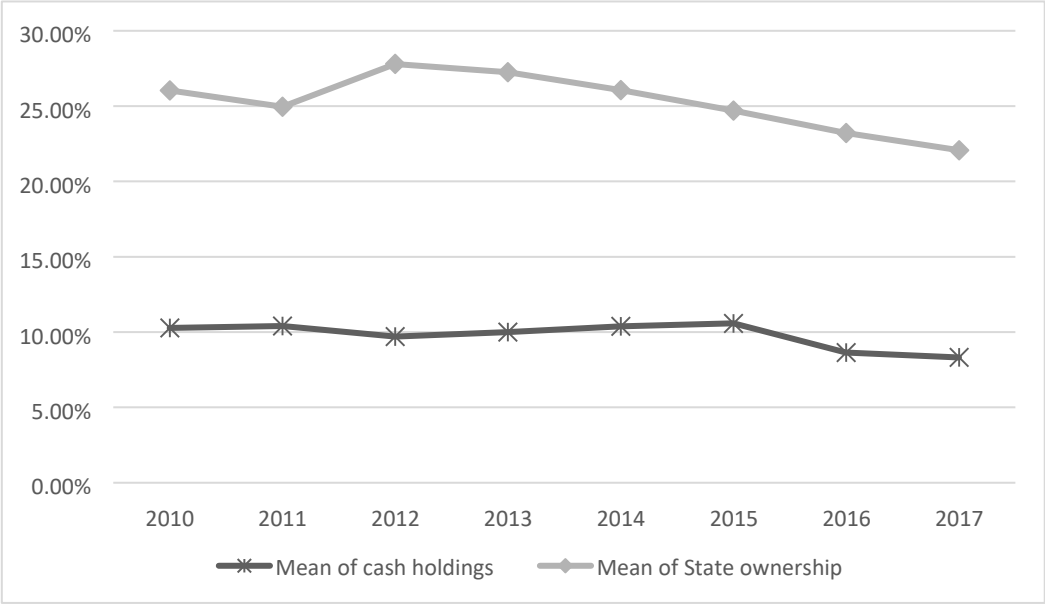
Figure 3.2. State ownership and cash holdings in Vietnam 2010-2017

(Note) The number of sample firms is 233, including SOEs and non-SOEs. The mean of state ownership denotes the sample average of state ownership ratio (STATE) for each firm. The mean of cash holdings denotes the sample average of CASH. See the definition of variables in Table 3.1

3.4.2. Univariate tests

Table 3.3 presents univariate comparisons of main descriptive variables by cash ratio quartile. I am interested in whether the characteristics of firms in the fourth quartile, which reserve the highest cash holdings, are different from those in the first quartile with the lowest cash balances. I use a t-test to check the hypothesis that fourth-quartile firms are significantly different from the first-quartile firms. It turns out that firms' characteristics do not always change monotonically with cash holding, such as NWC, SIZE. Thus, comparing the firms in the first and fourth quartiles of cash holdings is not adequate to describe the relation between cash holdings and firm characteristics.

As shown in Table 3.3, firms in the fourth quartile of cash holdings differ significantly from firms in the first quartile of cash holdings at the 1% level for STATE, CFLOW, FAR, LEV, BANKDEBT, DVD variables and at the 5% level for NWC variable. In general, most variables I am considering change monotonically as predicted by theories.

Table 3.3 Univariate comparison of means and medians of measures of firm characteristics

Variable	1st quartile	2nd quartile	3rd quartile	4th quartile	t-statistic
CASH range	0.00005-0.023	0.023-0.059	0.059-0.136	0.136-0.961	
CASH	0.011	0.040	0.090	0.250	-42.426
	(0.010)	(0.039)	(0.086)	(0.213)	(0.000)
STATE	0.224	0.254	0.261	0.271	-3.100
	(0.153)	(0.209)	(0.258)	(0.252)	(0.002)
AGE	9.575	9.730	9.923	9.476	0.422
	(9)	(10)	(10)	(9)	(0.673)
SIZE	26.933	26.985	26.940	26.783	1.531
	(26.920)	(27.005)	(26.920)	(26.552)	(0.126)
GROWTH	0.420	0.191	0.151	0.668	-0.418
	(0.061)	(0.082)	(0.088)	(0.090)	(0.676)
CFLOW	0.020	0.033	0.060	0.094	-8.405
	(0.014)	(0.022)	(0.053)	(0.085)	(0.000)
NWC	0.066	0.112	0.135	0.095	-2.156
	(0.033)	(0.092)	(0.119)	(0.080)	(0.031)
FAR	0.333	0.275	0.233	0.2010	9.889
	(0.292)	(0.224)	(0.196)	(0.170)	(0.000)
LEV	0.596	0.565	0.502	0.398	14.306
	(0.639)	(0.593)	(0.540)	(0.375)	(0.000)
BANKDEBT	0.557	0.500	0.392	0.267	16.477
	(0.593)	(0.551)	(0.390)	(0.140)	(0.000)
DVD	0.614	0.777	0.873	0.895	-10.534
	(1)	(1)	(1)	(1)	(0.000)

(Note) The number of sample firms is 233, including SOEs and non-SOEs. The mean and median (medians are bracketed) of variables are presented on the left side (1st to 4th quartile); t-values and p-values (p-values are bracketed) are presented on the right side (t-statistic). See the definition of variables in Table 3.1

Specifically, the cash flow to assets ratio rises monotonically with the cash ratio. The same result holds for the dividend payment (DVD). In contrast, the fixed assets to total assets ratio decreases monotonically across quartiles of cash holdings. The bank debt ratio and leverage ratio also decline from the first to the fourth quartile of the cash-to-assets ratio. However, firm age from equitization, firm size, and non-cash networking capital to assets change non-monotonically over the four quartiles of cash holdings. The average firm age in the fourth quartile of cash holdings is the youngest. The mean and median of firm size over the four quantiles are similar. The firms that belong to the highest cash holding range are even smaller than the ones with the least cash, but this difference is insignificant. NWC increases over the first three quartiles and decreases in the fourth quartile.

For the STATE variable, as expected, the univariate relation between cash and state ownership is monotonic. The firms with higher cash ratios are the firms with high state ownership ratios in terms of both mean and median values.

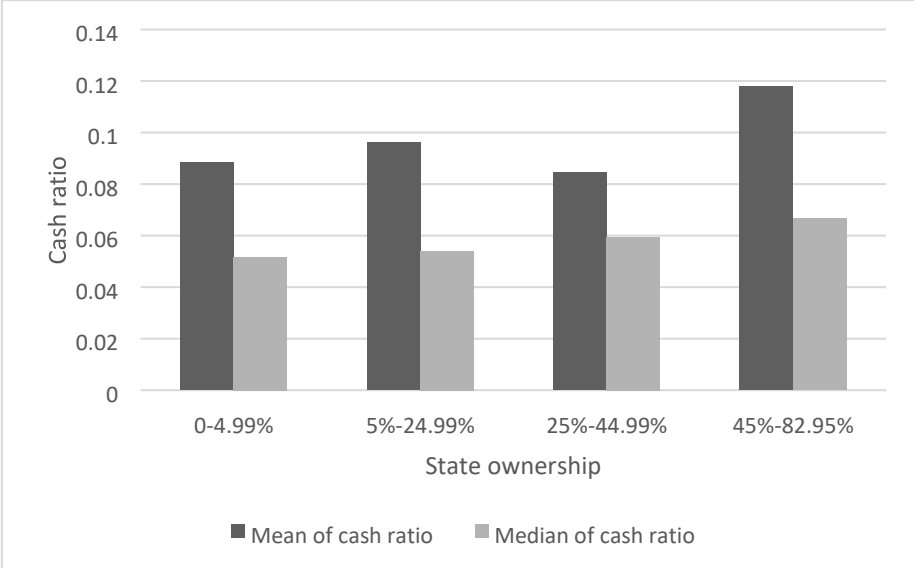**Figure 3.3. Cash holdings by state-ownership ratio ranges**

(Note) The number of sample firms is 233, including SOEs and non-SOEs. Total firm-years observations are 1864 from 2010-2017. The mean and median of CASH are calculated based on four groups of STATE, which are lower than 5%, from 5% and lower 25%, from 25% and lower 45%, and greater than or equal to 45%. See the definition of variables in Table 3.1

To investigate the pattern of the relation between state ownership and cash ratio in more detail, I calculate the mean and median of cash holdings to see how they change as the state ownership range. The first group includes all firm-year observations that state ownership is lower than 5%-the point that defines whether a shareholder is a major shareholder, and with state ownership smaller than 5%, there is no member of the board of directors of a firm is representative for the Government. The second group includes all firm-years that state ownership ratio is greater than or equal to 5% and is less than 25%, the third group state ownership range is from 25% to 45%, and the fourth one includes observations that have state ownership is greater than or equal to 45%.

As can be seen in Figure 3.3., both the mean and median of cash holdings of the fourth group-where, the state ownership ratios are the highest-are the highest compared with other groups. The medians of cash ratios increase from the first to the forth range of state ownership. This, moreover, show that firms in the higher state ownership ratio range hold more cash.

3.4.3. The relation between variables

Table 3.4 shows that for the Pearson correlation matrix, CASH has positive and significant correlations with STATE, CFLOW, DVD, and has significant negative relations with SIZE, FAR, LEV, BANKDEBT. The correlation coefficients among CASH and AGE, NWC are negative, and the correlation coefficient between CASH and GROWTH is positive, but these are insignificant.

The Spearman correlation matrix shows that CASH has significant positive correlations with STATE, GROWTH, CFLOW, NWC, DVD, and has negative correlations with SIZE, FAR, LEV, BANKDEBT. The coefficient of correlation between CASH and AGE is insignificantly positive. However, the most important thing is that Table 3.4 shows there is no issue of multicollinearity because the correlation coefficients between independent variables are not high, and VIF values are in acceptable ranges.

Table 3.4 Correlation Matrix

	CASH	STATE	AGE	SIZE	GROWTH	CFLOW	NWC	FAR	LEV	BANKDEBT	DVD	VIF
CASH	1	0.077	0.001	-0.066	0.057	0.256	0.083	-0.229	-0.338	-0.398	0.266	-
		(0.001)	(0.974)	(0.004)	(0.014)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
STATE	0.093	1	-0.160	0.011	-0.078	0.101	-0.116	0.048	0.159	-0.085	0.223	1.15
	(0.000)		(0.000)	(0.633)	(0.001)	(0.000)	(0.000)	(0.040)	(0.000)	(0.000)	(0.000)	
AGE	-0.035	-0.187	1	-0.040	-0.100	0.008	0.124	-0.153	-0.149	-0.028	-0.067	1.1
	(0.133)	(0.000)		(0.083)	(0.000)	(0.739)	(0.000)	(0.000)	(0.000)	(0.222)	(0.004)	
SIZE	-0.010	0.033	-0.010	1	0.118	-0.027	-0.305	0.083	0.361	0.403	0.093	1.32
	(0.000)	(0.150)	(0.679)		(0.000)	(0.248)	(0.000)	(0.0000)	(0.000)	(0.000)	(0.000)	
GROWTH	0.006	-0.026	0.027	-0.029	1	-0.041	-0.056	0.028	0.068	0.050	0.027	1.01
	(0.782)	(0.2582)	(0.249)	(0.213)		(0.075)	(0.015)	(0.232)	(0.003)	(0.030)	(0.240)	
CFLOW	0.177	0.093	0.009	-0.027	-0.011	1	-0.061	0.243	-0.269	-0.158	0.158	1.13
	(0.000)	(0.000)	(0.711)	(0.244)	(0.645)		(0.008)	(0.000)	(0.000)	(0.000)	(0.000)	
NWC	-0.0339	-0.1276	0.135	-0.319	0.005	-0.056	1	-0.369	-0.526	-0.307	0.012	2
	(0.143)	(0.000)	(0.000)	(0.000)	(0.819)	(0.016)		(0.000)	(0.000)	(0.000)	(0.603)	
FAR	-0.241	0.071	-0.151	0.084	-0.024	0.174	-0.393	1	-0.104	0.350	0.033	1.78
	(0.000)	(0.002)	(0.000)	(0.000)	(0.300)	(0.000)	(0.000)		(0.000)	(0.000)	(0.150)	
LEV	-0.329	0.144	-0.163	0.357	0.002	-0.205	-0.535	-0.070	1	0.339	-0.071	2.19
	(0.000)	(0.000)	(0.000)	(0.000)	(0.930)	(0.000)	(0.000)	(0.003)		(0.000)	(0.002)	
BANKDEBT	-0.450	-0.072	-0.026	0.392	-0.042	-0.139	-0.296	0.3617	0.378	1	-0.061	1.68
	(0.000)	(0.002)	(0.272)	(0.000)	(0.072)	(0.000)	(0.000)	(0.000)	(0.000)		(0.010)	
DVD	0.195	0.224	-0.076	0.092	-0.044	0.110	-0.004	0.010	-0.071	-0.067	1	1.10
	(0.000)	(0.000)	(0.002)	(0.000)	(0.056)	(0.000)	(0.8675)	(0.6551)	(0.002)	(0.004)		

(Note) This table reports the coefficients of correlations among cash holdings and other variables with the Pearson correlation in the lower triangle and the Spearman correlation in the upper triangle. The values in parentheses denote the p-value of Pearson and Spearman correlation, respectively. The number of sample firms is 233, including SOEs and non-SOEs. See the definition of variables in Table 3.1

3.4.4. Regression results and discussion

3.4.4.1. Regression models

The general model for Eq. (1) is estimated using ordinary least squares (OLS) regressions for the pooled sample as below:

$$CASH_{i,t} = \alpha_0 + \gamma_1 STATE_{i,t} + \gamma_2 AGE + \gamma_3(STATE_{i,t} \ x \ AGE_{i,t}) + \beta_k X_{it} + Industry \ fixed \ effects + \varepsilon_{i,t} \quad (1)$$

Subscripts i and t denote firm i at the end of year t. The dependent variable is $CASH_{i,t}$. State ownership, age from equitization, and the interaction between state ownership and AGE are the focuses of my analyses and the main explanatory variables. For state ownership, I use alternatively the state dummy variable (STATE_D) that equals one if state ownership ratio greater than zero, otherwise zero, instead of STATE. In Hypothesis 1, the predicted sign of coefficient γ_1 is positive according to the agency theory. In Hypothesis 2, the predicted sign of coefficient γ_2 is negative because time passing after equitization would bring about a better reputation and an improvement in the amount of information the markets have about such firms, reducing the marginal benefit from cash, therefore lowering cash holdings. In Hypothesis 3, I predict that the coefficient of the interaction term between STATE and AGE γ_3 has a negative sign for the reason that with the same level of state ownership, a better reputation and less the information asymmetry degree as the result of higher age help to mitigate the agency problems.

$X_{i,t}$ is a k-vector of control variables ($k = 1, 2, 3, …, K$), which include firm size (SIZE), growth opportunities (GROWTH), net operating cash flow (CFLOW), net working capital (NWC), fixed asset ratio (FAR), leverage (LEV), ability to access external capital (BANKDEBT), and dividend payment (DVD). Because of the disadvantage of the economies of scale, smaller firms are likely to be more financially constrained; they tend to maintain higher cash balances than larger firms to cope with unforeseen future liquidity shocks (Megginson et al., 2014). Therefore, I expect a negative relation between cash holding level and firm size according to the trade-off theory. To capture growth opportunities, following Dittmar et al. (2003), Bigelli and Sánchez-Vidal (2012), Vo (2017), I use the

sales' yearly growth rate-GROWTH and expect that it is positively associated with cash holdings. Sales are the source of cash, and to cope with sales growth, firms have to increase working capital; as a result, they have to provide more cash for higher demand for working capital. Most empirical studies supported the pecking-order theory on the extent that firms hold more cash when they make larger cash flow from their operation, such as Opler et al. (1999), Ozkan and Ozkan (2004), Bigelli and SánchezVidal (2012), and Megginson et al. (2014). Therefore, the variable for cash flow generated by a firm is expected to positively affect cash balances. Because non-cash current assets can be converted into cash at a low cost, they serve as the substitutions of cash. Hence, it is expected to be negatively related to cash holdings. The cash to total asset ratio has a negative nature relation with fixed assets to total assets ratio because cash and fixed-assets are components of total assets. Therefore, I expect that fixed assets ratio and cash ratio have a reverse relation as John (1993), Drobetz and Grüninger (2007), Tiago and Caldeira (2014), and Nguyen and Le (2017). According to the pecking order theory, enterprises typically raise debt when their internal capital is not sufficient to finance their investments. Therefore, leverage is expected to negatively affect cash holdings. To measure the ability to raise external funds, Ozkan and Ozkan (2004) employed the ratio of bank debt to total debts. If this ratio is high, it means that this is a good company (assessed by banks), and therefore this company is able to access external capital easily. Bank debt is expected to have a negative effect on cash holdings. The fact that capital markets penalize dividend cuts with significant stock price declines (Jensen 1986). Ozkan and Ozkan (2004) suggested that in order to avoid a circumstance in which dividend-paying companies are short of cash to pay dividends, those companies might hold more cash than non-dividend-paying companies might. In these cases, a positive relationship between cash holdings and dividend payments can be seen. Bigelli and Sánchez-Vidal (2012), Megginson et al. (2014), and Kusnadi et al. (2015) find that dividend payments are associated with more cash holdings. They explain that companies pay dividends as they earn more money, and vice versa, no dividend could be associated with a lack of cash. Therefore, it is predicted that DVD is positively associated with cash holdings.

Industry dummies are also included in all regressions to control for the corresponding fixed effects. Specifically, the industry dummies are based on the 14-industry classification benchmark.

3.4.4.2. Results and discussion

Table 3.5 presents results for pooled OLS regression models. Columns (1) and (2) present the regression results with STATE and STATE_D, respectively. Column (3) presents the results for the model includes AGE and control variables without state ownership variables. Column (4) presents the results for the model with STATE, AGE, the cross-term between STATE and AGE, and other control variables. Column (5) presents the results for the model with STATE_D, AGE, the cross-term between STATE_D and AGE, and other control variables.

As can be seen in Table 3.5, state ownership measured by STATE and STATE_D variables has positive coefficients in all of the four models and highly significant at the 1% level for the model (1), (4) and (5) and at the 5% level for the model (2). These are consistent with Hypothesis 1 that firms with high state ownership (or have state ownership) hold more cash, confirming the finding by Chen et al. (2018).

Coefficients for the AGE variable are negative and significant in all regressions, indicating that the cash ratio decreased as time passes after equitization, and it is in line with Hypothesis 2. Besides, significant negative coefficients of the interaction terms in models (4) and (5) show that the effect of state ownership on cash holdings diminished as the time passes after firms being equitized, which is consistent with Hypothesis 3. The results confirm the effectiveness of equitization in Vietnam on the aspect that equitization and privatization increase transparency and reduce the degree of information asymmetry and agency problems in comparison with former SOEs. In more detail, Panel B of Table 3.5 shows the marginal effects of STATE, AGE, and their interaction term on cash holdings according to regression coefficients in model 4. Panel C of Table 3.5 presents the marginal effects of STATE_D, AGE, and the interaction term between STATE_D and AGE on cash holdings as the regression results of model 5.

Table 3.5 The determinants of corporate cash holdings

VARIABLES	(1) CASH	(2) CASH	(3) CASH	(4) CASH	(5) CASH
STATE	0.043***			0.080***	
	(0.010)			(0.026)	
STATE_D		0.010**			0.045***
		(0.005)			(0.013)
AGE			-0.004***	-0.003***	-0.002*
			(0.001)	(0.001)	(0.001)
STATE x AGE				-0.005*	
				(0.002)	
STATE_D x AGE					-0.004***
					(0.001)
SIZE	0.001	0.001	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
GROWTH	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CFLOW	0.045**	0.047**	0.051**	0.048**	0.049**
	(0.020)	(0.021)	(0.020)	(0.020)	(0.020)
NWC	-0.308***	-0.305***	-0.310***	-0.311***	-0.311***
	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
FAR	-0.251***	-0.245***	-0.260***	-0.266***	-0.263***
	(0.020)	(0.020)	(0.020)	(0.021)	(0.021)
LEV	-0.267***	-0.258***	-0.271***	-0.282***	-0.279***
	(0.021)	(0.021)	(0.020)	(0.021)	(0.021)
BANKDEBT	-0.074***	-0.079***	-0.074***	-0.067***	-0.069***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
DVD	0.028***	0.032***	0.030***	0.026***	0.028***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Constant	0.364***	0.364***	0.403***	0.389***	0.368***
	(0.058)	(0.059)	(0.059)	(0.057)	(0.057)
Industry dummy	Yes	Yes	Yes	Yes	Yes
Observations	1,864	1,864	1,864	1,864	1,864
R-squared	0.460	0.455	0.468	0.473	0.472

Panel B: The marginal effects of AGE – continuous state ownership (model 4)

STATE (%)	Change in AGE (year)	The main effect of STATE on cash ratio	The effect of AGE on cash ratio	The total effect of STATE, AGE, and their interaction term on cash ratio
75%	1	6.00%	-0.68%	5.32%
50%	1	4.00%	-0.55%	3.45%
25%	1	2.00%	-0.43%	1.57%
0%	1	0.00%	-0.30%	-0.30%

Panel C: The marginal effects of AGE– dummy state ownership (model 5)

STATE_D	Change in AGE (year)	The main effect of STATE_D on cash ratio	The effect of AGE on cash ratio	The total effect of STATE_D, AGE and their interaction term on cash ratio
1	1	4.5%	-0.60%	3.90%
0	1	0.00%	-0.20%	-0.20%

(Note) The number of sample firms is 233 for each year, including listed SOEs and listed non-SOEs. See Table 3.1 for the definition of variables. Heteroscedasticity-robust standard errors are in parentheses. *** denotes p-value is less than 1%, ** denotes p-value is less than 5%, * denotes p-value is less than 10%, respectively.

Inversely, Table 3.5 shows that the cash ratio (CASH) is significantly positively related to operating cash flow (CFLOW). The finding is consistent with my prediction and with most empirical prior studies such as Opler et al. (1999), Dittmar et al. (2003), Ozkan and Ozkan (2004). Positive and significant coefficients of DVD variable in all regressions support the view that dividend-paying firms hold higher cash balances as findings by Ozkan and Ozkan (2004), Bigelli and Sánchez-Vidal (2012), and Megginson et al. (2014).

The signs of coefficients for SIZE and GROWTH control variables are not in line with the predicted effects and not statistically significant. The coefficients of SIZE are positive as the finding for the sample of listed firms on HOSE in the study by Vo (2017), but not significant in my study. Also, the coefficients of the GROWTH variable are negative and insignificant compared to positive and significant thereof by findings of Vo (2017). The reasons for these differences are the dissimilar datasets and explanatory variables used in the regression models of the two studies. The sample of this chapter includes all firms listed on HOSE and HSX, and most of them are former nonstrategic small and medium-sized SOEs.

3.4.4.3. Robustness tests

1) State ownership, bank loans, and cash holdings

Megginson et al. (2014) argue that soft-budget constraint (SBC) stems from state ownership. At high state ownership, firms have relatively soft budget constraints and hence heavily lean on loans from state-owned banks for liquidity needs. Conversely, low state ownership leads to relatively harder budget constraints, and hence these firms could not rely on bank loans for liquidity needs. In short, a firm's cash holdings should be more sensitive to change in bank loans at high state ownership and less sensitive at low state ownership. Similar to China, Vietnam's financial system, dominated by state-owned banks, is fertile ground for SBC syndrome. Therefore, following Megginson et al. (2014), I add the interaction term between state ownership and bank debt to Eq. (1), and keep AGE as a control variable but exclude the cross-term between AGE and STATE in Eq. (1) to check the SBC syndrome and compare the results with Megginson et al. (2014).

$$CASH_{i,t} = \alpha_0 + \gamma_1 STATE_{i,t} + \gamma_2(STATE_{i,t} \times BANKDEBT_{i,t}) + \beta_k X_{it} + Industry\ fixed\ effects + \varepsilon_{i,t} \quad (2)$$

Table 3.6 State ownership, bank loans, and cash holdings

	(1)	(2)
Panel A: Regression results	CASH	CASH
STATE	0.085***	
	(0.021)	
STATE_D		0.037***
		(0.009)
BANKDEBT	-0.041***	-0.031**
	(0.013)	(0.015)
STATE x BANKDEBT	-0.105***	
	(0.035)	
STATE_D x BANKDEBT		-0.061***
		(0.016)
AGE	-0.004***	-0.004***
	(0.001)	(0.001)
SIZE	0.002	0.002
	(0.002)	(0.002)
GROWTH	0.000	0.000
	(0.000)	(0.000)
CFLOW	0.051**	0.052***
	(0.020)	(0.020)
NWC	-0.308***	-0.309***
	(0.024)	(0.024)
FAR	-0.259***	-0.256***
	(0.021)	(0.020)
LEV	-0.282***	-0.278***
	(0.021)	(0.021)
DVD	0.025***	0.028***
	(0.005)	(0.005)
Constant	0.368***	0.376***
	(0.058)	(0.058)
Industry dummy	Yes	Yes
Observations	1,864	1,864
R-squared	0.476	0.474

Panel B: The marginal effects of BANKDEBT– continuous state ownership

STATE (%)	Change in BANKDEBT	The total effects of STATE, BANKDEBT and their interaction term on cash ratio
75%	10%	5.18%
50%	10%	3.32%
25%	10%	1.45%
0%	10%	-0.41%

(Note) The number of sample firms is 233 for each year, including listed SOEs and listed non-SOEs. See Table 3.1 for the definition of variables. Heteroscedasticity-robust standard errors are in parentheses. *** denotes p-value is less than 1%, ** denotes p-value is less than 5%, * denotes p-value is less than 10%, respectively.

The regression results are presented in Table 3.6 Columns (1) and (2) are the regression results of Eq. (2) with STATE and STATE_D, respectively. The effects of state ownership, age, and all other control variables have no change compared to the results of Table 3.5 except for the coefficients of GROWTH are positive but still insignificant. However, the main focus in this section is the effect of the interaction term between state ownership and bank debt.

The estimated sign of coefficients of BANKDEBT is negative and significant, which is consistent with Megginson et al. (2014). However, the negative and highly significant coefficients of the interaction terms between state ownership and bank debt contradict the results of Megginson et al. (2014). Therefore, my result suggests no evidence for soft budget constraint theory. In particular, both the coefficients of BANKDEBT and the interaction term are negative. Thus, high state ownership leads to a greater reduction in cash ratio as the effect of BANKDEBT. However, the positive coefficient of state ownership ratio tells us that the high state ownership, the more cash holdings. Therefore, to interpret the marginal effects on cash holdings, I must evaluate state ownership, bank debt, and their interaction term simultaneously. Panel B of Table 3.6 presents the total effect of state ownership, bank debt, and their interaction on cash holdings.

As can be seen in panel B, the sensitivity of cash holdings to bank debt is high when state ownership is high and low when state ownership is low, but to the extent that firms with high state ownership keep more cash. The conclusion holds for using the state dummy variable. These results are dissimilar to the finding by Megginson et al. (2014) that at high state ownership, an increase in bank debt leads to a greater reduction in cash holdings.

2) Regression results for other cash variable measurement and unbalanced panel

Bates et al. (2009) document that the cash to non-cash assets ratio creates extreme outliers for firms with most of their assets in cash. Hence, for the robustness check, I use cash and cash equivalents to non-cash assets (CASHN) as the dependent variable. The Eq. (1) becomes:

$$CASHN_{i,t} = \alpha_0 + \gamma_1 STATE_{i,t} + \gamma_2 AGE + \gamma_3(STATE_{i,t} \times AGE_{i,t}) + \beta_k X_{it} + Industry\ fixed\ effects + \varepsilon_{i,t} \quad (3)$$

Table 3.7 reports the regression results for robustness checks. Columns (1) to (3) report the results of the balanced dataset, while columns (4) to (6) are regression results for an unbalanced dataset using CASHN. Column (7) shows the regression results of Eq (1) for the unbalanced dataset.

For the balanced dataset, the outliers generated by using CASHN are significant for my sample and make R squared values dramatically smaller than the R-squared values using CASH as a proxy of cash holdings. Besides, outliers make the coefficients of state and the interaction term between state ownership and age for the balanced dataset in column (3) becoming insignificant. But the significant negative effect of age on cash holdings does not change.

The results of robustness checks using an unbalanced dataset presented in columns (4), (5), (6), and (7) one more time confirm that state ownership is positively and significantly associated with cash holdings while age after equitization negatively affects cash holdings. The negatively significant coefficients of the cross-terms between STATE and AGE in columns (6) and (7) confirm that the effect of state ownership diminishes due to the time passing after equitization.

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Table 3.7 Regression results of robustness tests.

VARIABLES	(1) CASHN	(2) CASHN	(3) CASHN	(4) CASHN	(5) CASHN	(6) CASHN	(7) CASH
STATE	0.228*		0.233	0.130**		0.265**	0.097***
	(0.122)		(0.203)	(0.065)		(0.057)	(0.018)
AGE		-0.014***	-0.010**		-0.006**	-0.002	-0.000
		(0.006)	(0.004)		(0.003)	(0.002)	(0.001)
STATE x AGE			-0.014			-0.016**	-0.007***
			(0.011)			(0.006)	(0.002)
SIZE	-0.027	-0.025	-0.025	-0.014**	-0.013**	-0.015**	-0.001
	(0.018)	(0.017)	(0.017)	(0.007)	(0.007)	(0.007)	(0.001)
GROWTH	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CFLOW	0.044	0.075	0.056	0.103	0.124*	0.105	0.074***
	(0.109)	(0.100)	(0.107)	(0.082)	(0.075)	(0.081)	(0.017)
NWC	-1.116***	-1.118***	-1.128***	-0.951***	-0.940***	-0.954***	-0.319***
	(0.364)	(0.364)	(0.368)	(0.184)	(0.180)	(0.185)	(0.018)
FAR	-1.000***	-1.018***	-1.050***	-0.819***	-0.807***	-0.832***	-0.258***
	(0.380)	(0.384)	(0.397)	(0.198)	(0.195)	(0.203)	(0.015)
LEV	-0.953***	-0.944***	-1.003***	-0.770***	-0.744***	-0.776***	-0.263***
	(0.336)	(0.326)	(0.352)	(0.172)	(0.163)	(0.175)	(0.015)
BANKDEBT	-0.038	-0.050	-0.015	-0.036	-0.054*	-0.030	-0.055***
	(0.060)	(0.053)	(0.068)	(0.038)	(0.032)	(0.040)	(0.008)
DVD	0.059***	0.073***	0.052**	0.080***	0.094***	0.083***	0.038***
	(0.022)	(0.026)	(0.021)	(0.020)	(0.024)	(0.020)	(0.004)
Constant	1.816**	1.965**	1.901**	1.217***	1.289***	1.269***	0.383***
	(0.796)	(0.855)	(0.814)	(0.311)	(0.331)	(0.329)	(0.040)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,864	1,864	1,864	3,217	3,217	3,217	3,217
R-squared	0.131	0.130	0.135	0.141	0.140	0.142	0.454

(Note) The number of sample firms of the balanced dataset and the unbalanced dataset include listed SOEs and listed non-SOEs. See table 3.1 for the definition of variables. Heteroscedasticity-robust standard errors are in parentheses. *** denotes p-value is less than 1%, ** denotes p-value is less than 5%, * denotes p-value is less than 10%, respectively.

3.5. Conclusion

Vietnam is a socialist republic country. Before 1990, almost all enterprises are 100% state-owned enterprises; however, many problems exist in those firms that force the Government of Vietnam to have an economic reform program. A number of SOEs have been equitized and listed on stock exchanges in order to reduce the inefficiency of those firms and promote the development of the stock market in Vietnam.

This chapter examines the effects of state ownership, age from equitization, and the interaction between age and state ownership on the level of cash of listed firms in Vietnam. The regression results provide strong evidence that state ownership is positively associated with cash holdings, which is consistent with the prediction of the agency theory and confirms the finding by Chen et al. (2018). Analysis based on state ownership ranges also shows that firms belong to the highest state ownership ratio range have the highest mean and median of cash holdings.

I further investigate that the coefficients of AGE and the cross-term between AGE and STATE are negative and significant. As time passes after being equitized, firms would have a better reputation and an improvement in the amount of information the market has about such firms. These would help to reduce the marginal benefit of holding cash as well as agency problems, leading to a decrease in cash holdings of listed firms in Vietnam. Besides, this chapter shows that most of the equitized listed firms do not have the soft-budget constraints due to the effect of state ownership. The reason probably is most listed firms in my sample were equitized from non-strategic SOEs. Another contribution of this chapter is the finding that firms with high state ownership hold more cash, suggesting SOEs need to have a good governance practice to mitigate the agency problems. The equitization process will not make much sense if corporate governance does not change, and the Government still holds dominant portions in enterprises.

CHAPTER 4. WHAT DO SHORT-TERM FINANCIAL ASSETS EXPLAIN THE CORPORATE CASH HOLDINGS CHANGES IN VIETNAM

4.1. Introduction

According to the pecking order theory, due to information asymmetries, raising capital from outside becomes harder for firms than using internal sources. Undoubtedly, outsiders know less than managers do; they may ask for a higher cost of capital in order to make sure their investments are not overpriced. Therefore, firms prefer internal finance to external finance, and the pecking order of financing is first retained-earnings, then debt, and finally, new equity (Myers, 1984). A firm with stable operating with long history tends to generate substantial free cash flows, and managers are likely to retain this cash under their control rather than pay it out to shareholders (Jensen, 1986). Instead of holding free cash flows as cash and cash equivalents, firms may invest in short-term financial assets (STFAs) likes stocks, bonds, certificates of deposits.

Many studies consider cash holdings, including all short-term financial assets (short-term investments interchangeably used) (Duchin et al., 2017). This makes the cash ratio does not fully reflex the cash management policy of firms. Short-term financial investments (STFIs) can be used as tools to keep cash within firms rather than return to shareholders. When firms allocate more liquid assets to STFIs, the cash and cash equivalents to total assets ratio (cash ratio for short) would be smaller than they do not. Investing in STFIs helps to reduce the cost of holding liquid assets because STFIs have higher rates of return than cash and cash equivalents. Thus, in this chapter, cash holdings are studied in relation to STFAs to fulfill the knowledge about the cash holdings policy of listed firms in Vietnam.

This chapter fills the gap in finance literature by providing evidence of the allocation of liquid assets in a developing country. More specifically, for listed firms in Vietnam, total liquid assets account for around 14-15% of total assets on average. However, financial managers in Vietnam become more skillful at managing firms' liquid assets portfolio when they tend to keep real cash levels at around 5%,

yearly reduce the proportion of cash equivalents, at the same time increase the proportion of short-term financial investments.

After showing the fact that managers in Vietnamese listed firms tend to reduce the proportion of cash holdings and to increase the proportion of STFAs, I look deep into the short-term financial asset compositions. First, it is found that almost all STFAs are held-to-maturity investments, which are safe investments with periodical returns. This is different from liquid assets management in the US. Duchin et al. (2017) show that industrial firms in the US invest heavily in noncash securities that are both risky and illiquid. Second, Chapter 4 examines the factors that affect the STFI ratio and finds that larger firms, older firms, would allocate more high liquid assets in STFI while firms with higher sales growth have a lower proportion of STFI.

4.2. Theory and empirics on firms' cash holdings versus short-term financial assets proportion

Managers tend to hold free cash flows under their control rather than pay it out to shareholders. However, they have to allocate firms' liquid assets in a portfolio that includes cash and cash equivalent that will be used within three months, and other short-term financial assets such as saving accounts and securities.

4.2.1. Literature review on the mix of liquid assets

Liquid assets include non-interest-bearing cash or real cash (cash on hand and demand deposits), cash equivalents, and short-term financial investments such as stocks, bonds, saving accounts, mutual funds (according to Azar et al., 2016). Also, firms would not spend all liquid assets at a time. Therefore, managers have to deal with the question of how much real cash and cash equivalents they should keep to ensure the liquidity of the firm in the short-term. One of the costs of holdings too much in non-

interest-bearing cash for transaction purposes is the forgone return that could receive from investing in short-term financial instruments.

Researchers over the years tried to build models to calculate the optimal real cash level for operational transactions of a company. The first model was introduced by Baumol (1952) based on the model of economic order quantity – EOQ in inventory management. The optimal real cash balance is determined as the equation below:

$$C^* = \sqrt{\frac{2bT}{i}}$$

Where: b is a fixed transaction cost of real cash replenishment by selling securities or withdrawal; T is total real cash that is estimated to be paid out in a certain period; i is the opportunity cost of holding real cash that is the rate of return on short-term financial investments.

This model can be used in such a way that the greater the opportunity cost of holding real cash i, the lower amount of cash keeps in hand; the higher the transaction cost b, the larger is the real cash balance and vice versa. Actually, it works in practice; Azar et al. (2016) find that because of high-speed e-banking technological progress; however, the cost and time required to convert interest-bearing assets into cash needed for transaction purposes declined. Therefore, the cash demand for transaction purposes declined by using electronic payment technology.

The answers to questions about what types and how much do firms invest in each type of liquid assets depend on two main factors, which are internal and external factors. In particular, external factors are transaction costs between different types of liquid-asset accounts and regulatory constraints (Azar et al., 2016). Before the era of online banking, SWEEP and negotiable orders of withdrawal accounts (NOW), such as in the time of study by Baumol (1952), the cost of liquidating less-liquid forms of liquid assets to the currency that can be used for transactions purpose was time-consuming and costly. By contrast, with the development of electronic payments, this liquidating cost is much smaller (Azar et al., 2016). Under the development of technology, managers have become more adept at managing high liquid assets, making use of a wide-range choice set. Azar et al. (2016) show that US firms hold

the proportion of non-interest-bearing cash to total liquid assets at about 100% in the 1950s, 60% in 1980, but just about 20% in the early 2010s; The rest of the liquid assets is allocated to short-term financial assets in many types of interest-bearing assets, ranging from savings and deposits to stocks, market mutual funds. Especially, Duchin et al. (2017) find that US firms invest heavily in risky and illiquid noncash securities, such as corporate debt, equity, asset-backed or mortgage-backed securities, up to 38.3 % of aggregate financial asset portfolios (including cash and cash equivalents, short-term financial assets, and long term financial assets). Risky short-term financial assets represent 23.2% of total liquid assets.

The mix of liquid assets also depends on internal factors. Azar et al. (2016) argue that smaller firms will keep more of their liquid assets in cash; by contrast, larger firms and firms with greater cash reserves tend to employ more advanced cash management strategies leading to a lower proportion of cash. Moreover, Azar et al. (2016) provide evidence for those firms with higher levels of liquid assets; firms with higher R&D expenses indeed invest more in interest-bearing liquid assets. Firms that hold mainly liquid assets for transactions have a higher proportion of cash.

4.2.2. Some aspects of the economy of Vietnam during 2014-2018

From the literature review, we can see that the external factors may have effects on the proportion of cash holdings and short-term financial investments. In this section, I provide some information about the external factors that affect the firms' cash holdings policy, which are interest rates and inflation rates.

Based on the information disclosure in annual reports of the State Bank of Vietnam through the period of 2014-2018, the interest rates are stable. The interest rates for the deposit of 1 to 6 months were at 5-5.5% in 2014, at 4.5-5.4% in 2015 and in 2016, at 4.3-5.5% in 2017, and 4.5-5.5% in 2018. The interest rates for the deposit of 6 to 12 months were 5.7-6.7% in 2014, at 5.4-6.5% in 2015 and in 2016,

and 5.3-6.5% in 2017, and 5.5-6.5% in 2018. In sum, the interest rates of 1 to 6 months and 6 to 12

months were at 4.3-5.5% and at 5.3-6.7%, respectively, over the 2014-2018 period.

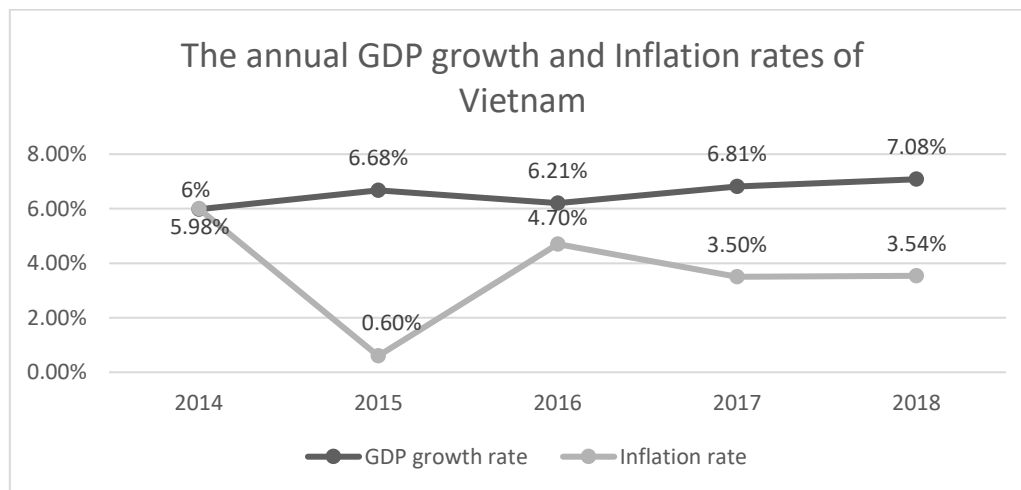The annual GDP growth and Inflation rates of Vietnam

Figure 4.1. The annual GDP growth and inflation rates of Vietnam from 2014-2018. Source: General

Statistics Office

Second, an increase in the inflation rate makes the cost of materials, inputs increase. In other

words, if the inflation rate goes up, the demand for cash transactions rises, then the proportion of short-

term financial investments decrease as the equation of Baumol (1952). In general, inflation rates were

kept at low rates. Figure 4.1. shows the inflation rates of Vietnam from 2014-2018 were under 4.7%

except for the year 2014 with a rate of 6%. Besides, Vietnam's economy grew stably with the annual

GDP growth rates (at constant 2010 prices) at around 6-7% over the 2014-2018 period.

4.2.3. The mix of liquid assets in Vietnam

In Vietnam, because of the undeveloped financial market, financial tools for firms to invest are

really limited and riskier than in developed countries. Nguyen and Nguyen (2016) state that products

on Vietnam's security market are mainly stocks, government bonds, and few investment funds.

Individual investors, who often have short-term investment strategies and herd behavior, account for

the majority of investors that lead to the volatility of the securities market in Vietnam. Therefore, firms

mainly hold their short-term financial assets under savings and time deposits. Liquid assets in Vietnam compose three main types, which are non-interest-bearing cash, cash equivalents, and short-term financial investments. Non-interest-bearing cash or real cash includes cash in hand and demand deposits. Cash equivalents consist of short-term, liquid investments with an original maturity of within three months that are readily convertible into known amounts of cash and that are subject to an insignificant risk of change in value. Hence, firms' cash equivalents are mainly short-term bank deposits with maturity from 1-3 months. Short-term financial investments include securities and held-to-maturity investments (mainly the 3-12-month deposits).
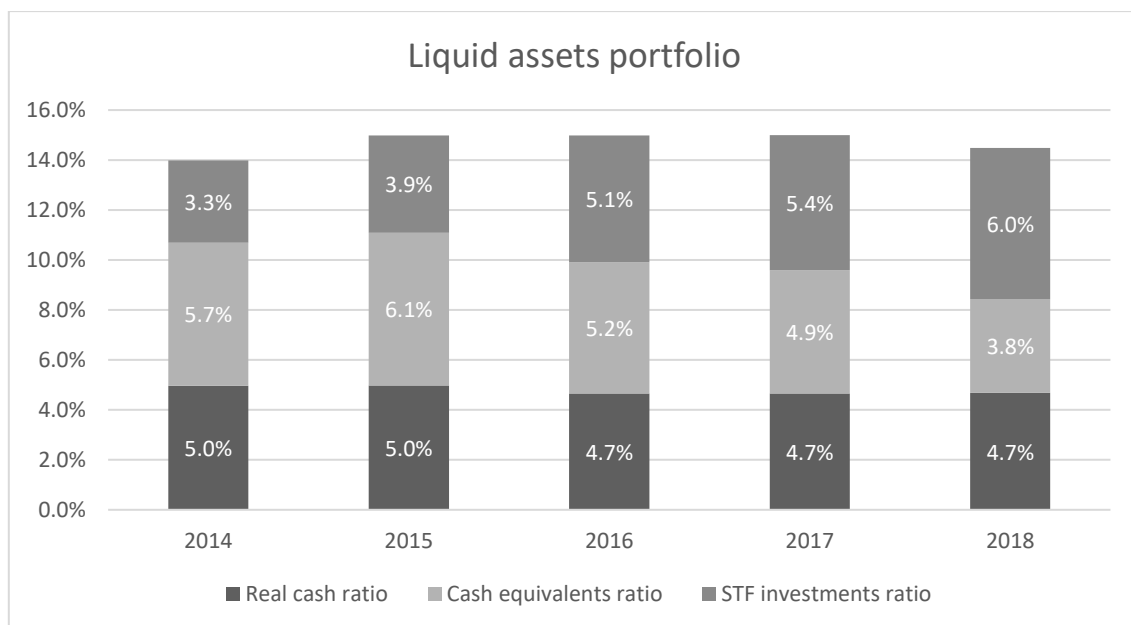

Figure 4.2. Elements of the aggregate corporate liquid assets portfolio of listed firms in Vietnam

The sample includes all 2924 non-financial firm-year observations from 2014 to 2018. The real cash ratio, cash equivalent, and STF investment ratios are calculated as the sum of real cash, cash equivalents, and STF investments divided by total assets. Data is provided by the FIINGROUP Joint-stock company.

Figure 4.2. illustrates the proportion of non-interest-bearing cash, cash equivalents, and short-term financial investments (STFIs) to total assets of listed firms in Vietnam for five years 2014-2018. As can be seen, the liquid assets portfolio annually accounted for 14-15% of total assets on average.

The proportions of three main types of liquid assets, however, have changed in the way that the proportion of STFIs increased annually. At the same time, the cash and cash equivalents ratios declined annually. Specifically, treasurer became more adept at managing high liquid assets portfolio when they moved cash equivalents to invest in STFIs to reduce the cost of holding liquid assets. This makes the STFI proportion significantly rose from 3.3% in 2014 to 6% in 2018, whereas the cash equivalents ratio reduced from 5.7% in 2014 to just 3.8% in 2018. The proportion of real cash to total assets reduce slightly from 5% in 2014 and 2015 to 4.7% in the next three years, from 2016 to 2018. The stable real cash ratio may imply that the cash demand for transactions is kept at a target ratio in total assets.
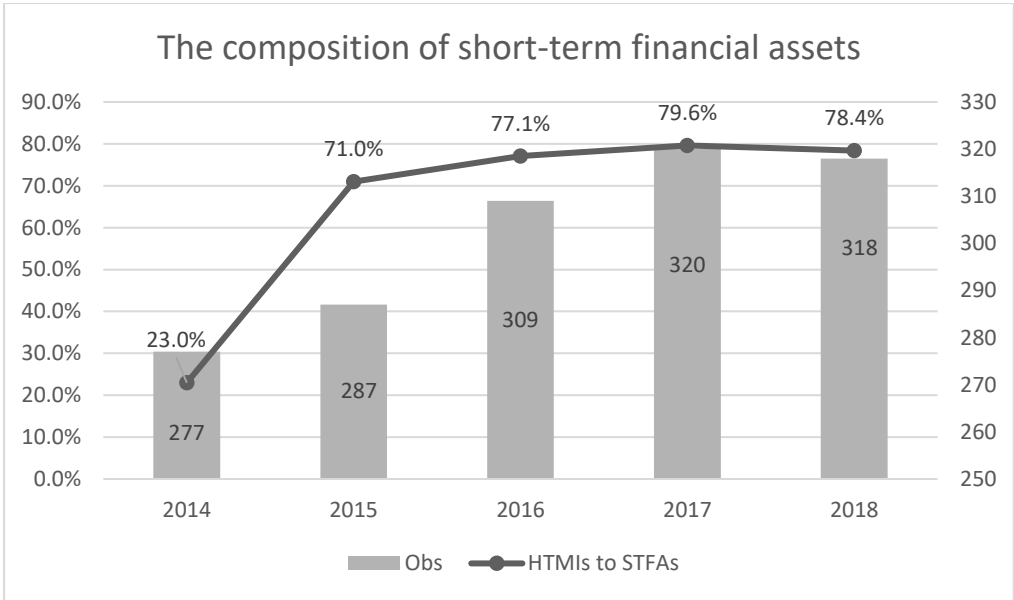

Figure 4.3. The components of short-term financial assets. The sample includes all non-financial 1511 firm-year observations (Obs) with STFAs greater than zero from 2014 to 2018. Data is provided by the FIINGROUP Joint-stock company.

Now I look deeply into the elements of STFAs. Instead of allocating more STFAs to securities, Vietnamese firms' managers hold them in held-to-maturity investments (HTMIs). Based on the sample of firms that have STFIs, including 1511firm-year observations from 2014-2018, HTMIs accounted for 73% of total short-term financial investments on average. In more detail, Figure 4.3. reveals that the number of firms that invest in STFA increase from 277 observations in 2014 to around 320 observations in 2017 and 2018. The HTMIs to STFAs ratio sharply grew from 23% in 2014 to 71% in 2015, and

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then leveled off approximately 78% from 2016-2018. According to circular No. 2002/2014/ of Ministry of Finance of Vietnam, HTMIs include assets that firms hold until maturity to earn profits periodically, such as term deposits, bonds, held to maturity loans. It means that HTMIs are safer than trading securities. These kinds of assets are easy to be used as mortgages to get loans from banks when firms need money in emergency cases. Therefore, in comparison with findings by Duchin et al. (2017), Vietnamese managers seem to be more risk-averse and less speculative than managers in the US are.

4.3. Hypothesis development

As for a liquid assets portfolio, the mix of cash holdings and STFIs depends on firms' characteristics such as cash flow volatility, sales growth, or debt level, and external factors like institutional constraints, inflation, and especially interest rate. However, interest rates in Vietnam for 2014-2018 were stable, and inflation rates were low (see section 4.2.2. for more details). Therefore, this chapter focuses on the operational parameters that affect liquid asset choices by managers. As presented in section 4.2.3., firms tend to hold more STFIs, which are mainly held-to-maturity assets, while reducing the proportion of cash equivalents. The benefits of investing in STFAs are keeping liquid assets under managers' control rather than paying it out to shareholders, reducing firm risks, and getting higher returns than putting money in types of cash and cash equivalents. Hence, it is interesting to investigate the internal determinants of the total amount of short-term financial investments to total assets ratio (STFIR) of listed firms in Vietnam.

As presented in section 4.2.1., Azar et al. (2016) find that larger firms tend to employ more advanced cash management strategies leading to a lower proportion of cash. Therefore, I assume that STFIR and firm size have a positive relation.

Hypothesis 1: firm size positively affects STFIR

Because older firms should have successful operations (Faulkender, 2002), more experiences, have enjoyed the benefits of learning (Majumdar, 1997), and, therefore, older firms tend to have higher free cash flows (Oxelheim & Randøy, 2003) or higher liquid assets. This suggests that older firms should have higher STFIRs, as Azar et al. (2016) also argue that firms with higher liquid assets tend to invest more in STFIs. Also, management in these firms should be better at managing high liquid asset portfolios to the extent that they would invest as much as liquid assets in STFIs. It is dissimilar to the age from equitization in Chapter 3; the age from the establishment shows how long a firm survives on the market. Therefore, using age from the establishment (AGE_ES) to measure the success and management experience of a company is better than using age from equitization.

Hypothesis 2: firm age from the establishment positively affects STFIR.

A firm that holds liquid assets mainly for transactions has a higher proportion of cash or a lower STFIR (Azar et al., 2016). Usually, to cope with sales growth, firms have to increase working capital. As a result, they have to provide more cash for higher demand for working capital. Therefore, firms with higher sales growth rates need more cash for transactions leading to a lower STFIR.

Hypothesis 3: the sales growth rate is negatively related to STFIR.

4.4. Data and analysis

4.4.1 Sample selection and variable measurement

The data used in this chapter is provided by the FIINGROUP Joint-stock company, except for the year of establishment is self-collected from listed firms' annual reports. Because the financial for the main variable, which is STFIR, is only available from 2014, the study period is 2014-2018.

The sample includes non-financial Vietnamese listed firms covering five years from 2014 to 2018. These enterprises are classified into 14 supersectors (under the Industry Classification Benchmark), which are oil and gas, chemicals, basic resources, construction and materials, industrial

goods and services, automobiles and parts, food and beverage, personal and household goods, health care, retail, media, travel and leisure, utilities and technology.

Financial variables are calculated based on yearly audited financial statements of the Vietnamese non-financial listed firms on the Hanoi Stock Exchange (HNX) and Ho Chi Minh Stock Exchange (HOSE) from 2014-2018. Firm-year observations that have any missing of any variables in Table 4.1 were excluded; finally, the sample in this chapter has 2924 firm-year observations.

Table 4.1 The definition of the variables used in Chapter 4

Variable	Definition
STFIR	The ratio of the total amount of short-term financial investments to total assets
CHE	Cash and cash equivalents plus short-term financial assets-also called liquid assets
CHER	The ratio of the total amount of CHE to total assets
CASH	The ratio of the total amount of cash holdings to total assets
RCR	The ratio of the total amount of real cash (cash on hand and demand deposits) to total assets
CER	The ratio of the total amount of cash equivalents to total assets
AGE_ES	The year t minuses the year of establishment
SIZE	The natural log of total assets
GROWTH	The yearly sales growth rate
CFLOW	The ratio of net cash flow from operation to total assets
NWC	The ratio of current assets minus current liabilities minus cash, cash equivalents, and short-term financial investments, divided by total assets
BLR	The ratio of the sum of short-term loans and long-term loans to total assets
DVD	Equals one if a firm pays cash dividends, and zero otherwise

Variables are defined in Table 4.1 STFIR is the ratio of the total amount of short-term financial investments to total assets. CHE is calculated as the sum of cash and cash equivalents plus short-term financial assets. CHER is the CHE to total assets ratio. CASH is the ratio of the total amount of cash holdings to total assets. RCR and CER are the ratios of the total amount of real cash, cash equivalents to total assets, respectively. AGE_ES is the year t minuses the year of establishment. SIZE is the natural log of total assets. GROWTH is the yearly sales growth rate. CFLOW is the ratio of net cash flow from operation to total assets. NWC is the ratio of current assets minus current liabilities minus cash, cash equivalents, and STFIs, divided by total assets. BLR is the ratio of the sum of short-term loans and long-term loans to total assets. DVD is a proxy for dividend payments and equals one if a firm pays cash dividends and zero otherwise.

4.4.2. Summary statistics

Table 4.2 presents summary statistics, including the mean, min, max, and standard deviation of variables. As shown in Table 4.2, the average STFIR is 4.7%. CASH, RCR, and CER averagely account for 10%, 4.8%, and 5.2 % of the total assets, respectively. The average firm age from the establishment is 26 years old. The mean of SIZE is 27.109, which means the average firm has total assets of 2120 billion VND. Firms in my sample have an average yearly sales growth rate of 40.7%. The average operating cash flow to total assets (CFLOW) of firms is 5.4%. The mean of networking capital to total assets (NWC) is 6.9 %. Firms in my sample have bank loans to total assets ratio of 22.5% on average. Finally, 70% of observations have dividend payments.

Table 4.2 Summary statistics of variables

Variable	Obs	Mean	Std. Dev.	Min	Max
STFIR	2,924	0.047	0.106	0.000	0.836
CHER	2,924	0.147	0.159	0.00005	0.974
CASH	2,924	0.100	0.115	0.000	0.961
RCR	2,924	0.048	0.055	0.00001	0.768
CER	2,924	0.052	0.100	0	0.954
AGE_ES	2,924	26.200	15.137	1.000	110.000
SIZE	2,924	27.109	1.496	23.330	31.991
GROWTH	2,924	0.407	5.532	-1.000	244.456
CFLOW	2,924	0.054	0.142	-1.100	1.009
NWC	2,924	0.069	0.201	-0.734	0.976
BLR	2,924	0.225	0.191	0.000	0.7980
DVD	2,924	0.702	0.457	0.000	1.000

(Note) The sample includes all 2924 non-financial firm-year observations from 2014 to 2018. See Table 4.1 for the definition of variables. Data is provided by FIINGROUP Joint-stock company, except for the AGE_ES variable is self-collected.

4.4.3. Univariate analysis

Table 4.3 presents univariate comparisons of main descriptive variables by STFIR quartile. I am interested in whether the characteristics of firms in the fourth quartile, which invest in the highest STFIR level, are different from those in the first quartile with the lowest STFIR level. I use a t-test to check the hypothesis that fourth-quartile firms are significantly different from the first-quartile firms.

First, Table 4.3 shows that 48.32% of firm-year observations (1413 out of a total of 2924 observations) have no STFI. The proportions of real cash are not different among the quartiles. The t-test for the difference of real cash ratio between the first and the fourth-STFIR quartile shows an

insignificant result as well. According to Table 4.3, 75% of firm-year observations (2193 out of 2924 observations) on average keep at least 82% (100%-18%) of their liquid assets under cash and cash equivalents (CCE or cash holdings). In comparison with Duchin et al. (2017), while firms in the US have diversified high liquid assets portfolios, the liquid assets of listed firms in Vietnam mainly include CCE, and most firms do not have STFIs. Specifically, firms in the US just keep 56.36% CCE in the total high liquid assets portfolios-CHE, the ratio of CCE accounts for 80.3% of CHE on average in cases of listed firms in Vietnam.

Second, it turns out that firms' characteristics do not always change monotonically with STFIR as predicted, with such variable SIZE, GROWTH, CFLOW, NWC, and BLR. Thus, comparing the firms in the first and fourth quartiles of cash holdings is not adequate to describe the relation between STFIR and firm characteristics.

Third, consistent with my prediction, Table 4.3 reveals a monotonic relation between AGE_ES and STFIR to the extent that older firms have higher STFIRs. Also, if not taking the second quartile of STFIR into account because of much fewer observations than other quartiles, the CHER variable monotonically increases across quartiles of STFIR. This is consistent with findings by Azar et al. (2016) that firms with greater liquid assets levels hold more STFIs. Besides, firms in the fourth quartile of STFIR differ significantly from firms in the first quartile of STFIR at the 5% and 1% level for AGE_ES, and CHER variables.

Finally, liquidity assets holdings are affected by the capital structure of firms. On the one hand, one would concern that firms hold more liquid assets to provide rents for the main banks and decrease banking monitoring costs (Pinkowitz and Williamson, 2001). On the other hand, according to the pecking order theory, firms raise external financing when internal funds are not sufficient. It means that firms with high bank debt ratios hold less liquid assets (Opler et al. 1999). Vietnam demonstrates specific features of a bank-based financial system where external financing is mostly bank debt, so there is a likelihood that firms hold higher proportions of liquid assets because of the bank power effect.

However, Table 4.3 shows evidence to support the pecking order theory. Firms with the highest liquid

assets ratios (quantile 4) have the lowest bank debt ratios.

Table 4.3 Univariate comparison of means and medians of measures of firm characteristics

Variable	1st quartile	2nd quartile	3rd quartile	4th quartile	t statistic
STFIR range	0-0 (Obs. 1,413)	(0-0.00002) (Obs. 49)	0.00005-0.038 (Obs. 731)	0.038-0.836 (Obs. 731)	
CHER	0.091 (0.045)	0.083 (0.043)	0.111 (0.079)	0.294 (0.264)	-31.238 (0.000)
STFI to CHE	0.000 (0.000)	0.003 (0.0004)	0.181 (0.105)	0.606 (0.632)	-35.156 (0.000)
CASH	0.091 (0.045)	0.083 (0.043)	0.100 (0.066)	0.115 (0.080)	-4.532 (0.000)
RCR	0.048 (0.028)	0.050 (0.031)	0.048 (0.036)	0.047 (0.035)	0.282 (0.777)
CER	0.044 (0.000)	0.033 (0.005)	0.052 (0.013)	0.069 (0.028)	-5.401 (0.000)
AGE_ES	25.6 (22)	26.6 (21)	26.6 (24)	27.1 (25)	-2.239 (0.025)
SIZE	26.70 (26.592)	27.408 (27.084)	27.63 (27.670)	27.37 (27.183)	-10.234 (0.000)
GROWTH	0.537 (0.062)	0.116 (0.078)	0.161 (0.086)	0.422 (0.075)	0.391 (0.696)
CFLOW	0.054 (0.048)	0.032 (0.025)	0.039 (0.038)	0.072 (0.066)	-2.721 (0.007)
NWC	0.094 (0.067)	0.097 (0.109)	0.056 (0.028)	0.034 (0.018)	6.25 (0.000)
BLR	0.235 (0.214)	0.252 (0.253)	0.272 (0.265)	0.159 (0.090)	8.933 (0.000)
DVD	0.638 (1)	0.653 (1)	0.744 (1)	0.787 (1)	-7.107 (0.000)

(Note) The mean and median (medians are bracketed) of variables are presented on the left side (1st to 4th quartile); t-values and p-values (p-values are bracketed) are presented on the right side (t-statistic). See the definitions of variables in Table 4.1 Data is provided by the FIINGROUP Joint-stock company, except for the AGE_ES variable is self-collected.

4.5. Regression results and discussion

4.5.1 Regression models

The general model for Eq. (1) is estimated using ordinary least squares (OLS), fixed effects, and GMM regressions. Industry dummies and year fixed effects are also included in OLS regressions to control for the corresponding fixed effects in Pooled. According to Azar et al. (2016), the increase of cash holdings of the previous year predicts a decrease in the proportion of cash holdings current year. Therefore in the GMM regression model, I regress the lag values of the cash variable.

$$STFIR_{i,t} = \alpha_0 + \gamma_1 SIZE_{i,t} + \gamma_2 AGE\_ES_{i,t} + \gamma_3 GROWTH_{i,t} + \beta_k X_{it} + Industry\ fixed\ effects + \varepsilon_{i,t} \quad (1)$$

Subscripts i and t denote firm i at the end of year t. The dependent variable is $STFIR_{i,t}$. Size, age from the establishment-AGE_ES (I also have results for age from equitization to check the effect of equitization), and Growth are the focuses of my analyses and the main explanatory variables. In Hypothesis 1 and 2, the predicted sign of coefficient γ_1 *and* γ_2 are positive for the reasons that larger firms and older firms should be more skillful at using advanced cash management strategies, leading to a higher STFIR. In Hypothesis 3, the predicted sign of coefficient γ_3 is negative because if a firm is experiencing sales growth, the need for cash transaction will increase; all else equal, STFIR declines.

$X_{i,t}$ is a k-vector of control variables ($k = 1, 2, 3, \ldots K$), which include firm cash holdings (CASH), net operating cash flow (CFLOW), net working capital (NWC), bank loans ratio (BLR), and dividend payment (DVD). Most empirical studies supported the pecking-order theory on the extent that firms hold more liquid assets when they make larger cash flows from their operation, such as Opler et al. (1999), Ozkan and Ozkan (2004), and Megginson et al. (2014). Therefore, the variable for cash flow generated by a firm is expected to positively affect STFIR. Because of the balance sheet's characteristic, the STFIR has a negative nature relation with cash ratio, NWC (without liquids assets) because they are components of total assets. Therefore, I expect that the cash ratio, NWC have reverse effects on STFIR. Firms would retire their bank loans if their liquid assets are greater than their need for transaction purposes. Therefore, the bank loan ratio is expected to negatively affect STFIR. The fact that capital markets penalize dividend cuts with significant stock price declines (Jensen 1986). Ozkan and Ozkan

(2004) suggested that in order to avoid a circumstance in which dividend-paying companies are short of cash to pay dividends, those companies might hold more CHE than non-dividend-paying companies might. In these cases, they would put this cash reserve for paying dividends in STFIs. Therefore, it is predicted that DVD is positively associated with STIFR.

4.5.2. Results and discussion

Table 4.4 presents the results of regression models. Columns (1) and (2) deliver the regression results using the OLS method; Columns (3) and (4) present the results using the fixed-effect method; Columns (5), (6) present the results using a dynamic model.

Positive significant coefficients of SIZE are consistent with Hypothesis 1 that larger firms tend to have higher STFIR due to more skillful at using advanced methods to manage liquid assets. The coefficients are significant at the 10% level using OLS and GMM methods.

Coefficients for the AGE_ES variable are insignificant using OLS and dynamic regressions. However, fixed effect regressions provide a positive and significant coefficient of AGE_ES at a 1% level, suggesting that there is a high likelihood that managers accumulate higher liquid assets under STFIs. This evidence is consistent with Hypothesis 1. Interestingly, the coefficients of age from equitization-AGE-are positive in all regression methods and highly significant at the 1 % level using OLS and Fixed-effects methods. The positive coefficients of AGE show that the higher the firm-age after equitization, the higher the STFIR is. This implies that as firms become older after equitizations, managers are more skillful at managing liquid assets. This finding is also consistent with the result of Chapter 3 that as firm age after equitization increases, firms reduce cash holdings.

As can be seen in Table 4.4, as predicted, in all regression models, the coefficients of the GROWTH variable are negative. The OLS regression results show the GROWTH variable significant at the 5% level for the model with AGE_ES variable and 10% for the model with AGE variable. These are consistent with Hypothesis 3 that when firms need more cash for transactions when they have a higher sales growth rate, they tend to have less STFIR.

Table 4.4 The determinants of short-term financial investments

VARIABLES	(1) STFIR	(2) STFIR	(3) STFIR	(4) STFIR	(5) STFIR	(6) STFIR
L. STFIR					0.440**	0.440**
					(0.204)	(0.204)
SIZE	0.003*	0.003*	0.002	0.002	0.015*	0.015*
	(0.002)	(0.002)	(0.006)	(0.006)	(0.009)	(0.009)
AGE_ES	-0.000		0.005***		0.003	
	(0.000)		(0.001)		(0.002)	
AGE		0.002***		0.005***		0.003
		(0.001)		(0.001)		(0.002)
GROWTH	-0.000**	-0.000*	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CASH	-0.142***	-0.138***	-0.339***	-0.339***		
	(0.021)	(0.020)	(0.045)	(0.045)		
L.CASH					0.285***	0.285***
					(0.074)	(0.074)
CFLOW	0.006	0.004	0.013	0.013	0.069***	0.069***
	(0.016)	(0.016)	(0.012)	(0.012)	(0.023)	(0.023)
NWC	-0.138***	-0.137***	-0.156***	-0.156***	-0.087***	-0.087***
	(0.014)	(0.014)	(0.024)	(0.024)	(0.026)	(0.026)
BLR	-0.202***	-0.203***	-0.095***	-0.095***	-0.022	-0.022
	(0.014)	(0.014)	(0.028)	(0.028)	(0.028)	(0.028)
DVD	0.010**	0.008*	0.000	0.000	-0.007	-0.007
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
Constant	0.026	0.002	-0.061	0.011	-0.485**	-0.439*
	(0.049)	(0.049)	(0.157)	(0.162)	(0.219)	(0.236)
Observations	2,915	2,915	2,920	2,920	1,677	1,677
R-squared	0.132	0.137	0.188	0.188		
Number of Firms			617	617	599	599

(Notes) See Table 4.1 for the definition of variables. Data is provided by FIINGROUP Joint-stock company, except for the AGE_ES and AGE variables are self-collected. *** denotes p-value is less than 1%, ** denotes p-value is less than 5%, * denotes p-value is less than 10%, respectively.

In addition, Table 4.4 reveals that cash ratio, net working capital (NWC) is significantly negatively associated with STFIR as predicted. Contrarily, firms invest more in STFIR if they generate more cash from their business. OLS models deliver the significant positive effect of DVD on STFIR at the level of 5 % and 1% for the models with AGE_ES and AGE, respectively.

For the effect of capital structure, Table 4.4 shows that all regression coefficients of BLR are negative in all regression and significant at 1% level for OLS and Fixed-effects regressions. The results one more time confirm that firms with fewer bank loans have higher STFIR that consistent with pecking order theory.

4.6. Conclusion

This chapter examines the relation between cash holdings and STFIs, the two main types of liquid asset portfolios. Managers tend to accumulate high liquid assets when they earn more rather than return free cash flows to shareholders. One reason is that managers would confront large stock price plummeting if they reduce dividend in the future (Jensen, 1986). Second, internal capital accumulation broadens managerial discretion, avoids market discipline, and creates a buffer for firms to deal with unexpected circumstances (Opler et al., 1999). The thing is how to manage liquid assets efficiently. In Vietnam, firms tend to keep the cash demand for transactions at around 5 % of total assets. The rest of the liquid assets are cash equivalents and STFIs. Managers seem to be adept at managing liquid assets over time by reducing the cash equivalents to assets ratio while increasing the STFIs to assets ratio. This helps firms reduce the cost of keeping liquid assets compared to maintaining a higher cash holdings ratio.

In Chapter 3, we can see that firms reduce cash over time. And Chapter 4 explains the trend by showing that firms hold yearly14-15% of their assets under liquid assets. But managers moved cash holdings to invest in short-term financial investments. Of these STFIs, 73% are held-to-maturity investments with periodical profits. Held-to-maturity investments help protect firms against business

risks but have low pecuniary returns in comparison with trading securities. Also, a large HTM ratio raises the agency cost between managers and shareholders. Therefore, shareholders should pay attention to this type of asset if there is an accumulation of HTM over time.

This chapter also examines the internal factors that make firms invest more or less in STFIs. It is found that larger firms, older firms tend to have a higher proportion of STFIs because of being more skillful at managing liquid assets portfolio. By contrast, firms with larger sales growth rates are likely to have lower STFIR. Especially, the equitization variable has positive coefficients significant at the 1% level using OLS and fixed-effects models. This proves the good effect of equitization to the extent that managers are better at managing liquid assets by yearly investing more cash holdings in investments with higher return rates.

CHAPTER 5. CONCLUSION

Cash holdings management is a tool that helps firms running smoothly because cash holdings serve as a measure of the liquidity for firms. It means determining how much cash to retain to carry out firms' activities without any serious interruption and create a buffer against the cash flow risk. Therefore, cash holdings depend on firm-specific characteristics such as firm size, growth opportunities, leverage, and ownership structure. Besides, there are outside factors that influence cash holdings, such as interest rate, the quality of government. Accumulation cash more than firms' liquidity demand may show the agency problems.

As a whole, this thesis provides a picture of cash holdings management of non-financial listed firms in Vietnam. First, in Chapter 3, I document that with the unique setting of Vietnam, which is most listed firms were equitized from 100% SOEs, agency problems due to state ownership have an impact on the cash holdings of these firms. Regression results show that state ownership is significantly positively associated with cash holdings. However, the negative coefficients of age and the interaction between state ownership suggest that this effect of state ownership diminished as age after equitization increases. The reason for that is from equitization firms have to meet many requirements on information disclosure that anyone can access, such as submission of quarterly, semi-annual, and annual financial statements on time. Information disclosure rules help to improve the transparency of Vietnam's stock market, decrease the degree of information asymmetry in equitized firms compared to former SOEs. The longer the history of capital market transactions leads to an improvement in the amount of information the markets that help to reduce agency problems. As a result, all else equal, older firms hold less cash because of less information asymmetry. Besides, unlike findings by Megginson et al. (2014), I found that the coefficients of the interaction term between state ownership ratio and bank debt are negative and significant, which is evidence for no soft-budget constraint in almost of equitized firms in Vietnam.

Second, the research on cash holdings management will complete when we consider how much cash to keep for transaction purposes in relation to how much other liquid assets to keep for precautionary or speculative purposes. In Chapter 3, we can see the positive effect of being equitized and listed on the stock exchange on cash holdings to the extent that cash holdings are reduced by the time. This time declined trend will be explained in Chapter 4. In more detail, I look at cash holdings in the total liquid assets and find that liquid assets portfolio annually accounts for 14-15% of total assets on average. But managers became more adept at managing liquid assets portfolio when they reduce cash equivalents proportion to invest more in STFIs. This action helps to reduce the cost of holding liquid assets and can be seen as a good effect of equitization in a term of improving the efficiency of firms. Besides, Chapter 4 points out that corporate managers in Vietnam seem to be risk-averse in comparison with corporate managers in the US when most STFIs are held-to-maturity investments. The thing is that held-to-maturity investments belong to financial short-term financial investments, not cash and cash equivalents account. They are safe, creating a buffer for firms but have low pecuniary returns. Therefore, shareholders should pay attention to this type of asset because the continuous accumulation of held-to-maturity investments may show that managers try to keep as much money as they can under their control rather than return it to shareholders. This increases the agency conflict between managers and shareholders.

Regarding future research, in Chapter 3, to evaluate the effect of state ownership on cash holdings in more detail, future research can assess how the changes of state ownership affect the changes of cash holdings. The location of firms may have interaction with state ownership to the extent that firms in less developed provinces may have a more severe agency problem due to state ownership, leading to higher cash holdings levels. Also, state ownership is under the control of different management bodies such as ministries, State Capital Investment Corporation (SCIC), state economic groups, and state corporations, state institutions, finance, and investment state-owned companies. Future research may examine this feature because it may affect cash holdings at different levels.

Also, there are some points that need to be improved in Chapter 4. First, 48.3% of firm-year observations (1413 out of a total of 2924 observations) have no STFIs, which may affect the regression results. Also, future research can focus on how managers spend held-to-maturities investments. For instance, they increase long-term investments and/or dividends?

NOTES

1) I employ the definition of SOEs according to the Vietnamese general statistics office (GSO), which are the firms with more than 50% state ownership. It is easier to compare with prior studies about Vietnam's state-owned enterprises (SOEs) such as Wacker (2017), and O'Toole et al. (2016) used data and the term "SOEs" of GSO.

2) O'Toole et al. (2016) state that the most well-known measure of Q (the ratio of the market value of equity and bonds to the book value of the firm) is not applicable in their research as their interest is in SMEs, the majority of whom do not have financial market listings. They used a vector auto regression (VAR) on firm performance indicators to estimate a "fundamental Q" which can be used as a proxy for the Q statistic for firms without bond or market listings.

3) This classification is based on FTSE Russel Benchmark as the link below:

https://www.ftserussell.com/data/industry-classification-benchmark-icb

4) 176 over a total of 180 state-owned firms were equitized before 2008, it means that the majority of this sample is non-strategic small and medium-sized SOEs (see Wacker, 2017). When the state equitized those firms, they aimed at mobilizing capital of domestic and foreign individuals, economic organizations, and social organizations as well as improving equitized firms' governance and moving them towards market competitiveness.

5) It is different from China that Vietnam's laws do not divide shares into six types: state, legal person (also called institutional), foreign, management, employee, and individual shares (Chen et al.

2009). Therefore, state ownership (STATE) here is the fraction of total shares owned by state shareholder(s). In a firm, there may be one or more than one state shareholders, including the State management authorities, State Capital Investment Corporation (SCIC), state economic groups, and state corporations, state institutions, finance, and investment state-owned companies. This may lead to the difference between state ownership in This chapter and Megginson et al. (2014) when firms have state shareholders own legal shares according to China's laws. For example, a firm has 20% shares owned by the state management authority and 35% shares owned by a 100% SOE, the state ownership ratio is 20% in Megginson et al. (2014), but the state ownership ratio in This chapter is 55%. Another case is if a firm is a subsidiary of a 100% SOE with 60% ownership, state ownership in my case is 60% but 0% in Megginson et al. (2014).

6)   At least 75% of 1864 values of the market to book ratio are lower than 1. It means that most of the firms are valued lower than their book values. This is abnormal, the reason for that may be the undeveloped financial market in Vietnam. Therefore, I use the GROWTH variable (measured by yearly sales growth rate) to capture the growth opportunities of firms following Dittmar et al. (2003), Bigelli and Sánchez-Vidal (2012), Vo (2017).

7)   The reason for the slight difference from Toan Luu and Tran Bao (2017) is my data set includes not only listed firms on the Ho Chi Minh Stock Exchange but also listed firms on the Hanoi Stock Exchange and the period of research by Toan Luu and Tran Bao (2017) is 11 years, from 2006-2016.

APPENDIX TABLE

Year of Equitization

Firm	Year of equitization	Firm	Year of equitization	Firm	Year of equitization	Firm	Year of equitization
AAA	2007	HAT	2006	PIT	2004	STC	2005
AAM	2002	HAX	1999	PLC	2003	STG	2007
ALT	1998	HBE	2004	PMS	1999	SVC	2005
ALV	2008	HCC	2001	PNC	1999	TBX	2001
ANV	2000	HCT	2003	PNJ	2004	TC6	2007
APC	2003	HEV	2004	POM	2008	TCL	2007
APP	2003	HGM	2005	PRC	2002	TCS	2007
ASM	1997	HHC	2003	PTC	2004	TCT	2001
BBC	1999	HHG	2001	PVD	2005	TJC	2000
BBS	2003	HLY	2003	PVG	2007	TKC	2007
BCC	2006	HMH	2002	PVS	2006	TLG	2005
BDB	2007	HPG	2001	PVT	2007	TLH	2009
BLF	2006	HST	2005	PVV	2007	TMC	2000
BMC	2001	HT1	2000	PVX	2004	TMP	2006
BPC	1999	HTC	2001	PXI	2009	TMT	2006
BST	2004	HTI	2007	PXS	2009	TNA	2000
BTP	2006	HTP	2003	QHD	2003	TNG	2003
BTT	2004	HVT	2005	QNC	2005	TPC	2001
C92	2004	ICG	2006	QST	2004	TPH	2004
CAN	1999	IMP	2001	QTC	2003	TS4	2001
CII	2001	KDC	2002	RAL	2004	TSC	2003

CJC	2005	KHP	2004	RDP	2005	TV2	2007
CKV	2005	KMT	2005	REE	1993	TV3	2007
CLC	2003	KSB	2006	S55	2004	TXM	2006
CMC	2004	KSH	2000	S74	2007	TYA	2005
CMI	2007	L10	2007	SAM	1998	UNI	1993
CMS	2007	L18	2006	SAV	2001	V12	2003
CMT	2003	L35	2006	SBT	2007	VBC	2002
CMV	2007	L43	2005	SC5	2004	VC1	2003
CT6	2002	L61	2005	SCD	2004	VC2	2003
CTB	2004	LAF	1995	SCJ	2003	VC6	2000
DAD	2007	LBE	2004	SCL	2007	VC7	2002
DAE	2004	LBM	2003	SD2	2006	VC9	2004
DBC	2004	LCD	2004	SD4	2007	VCC	2005
DC2	2004	LDP	1999	SD5	2004	VCM	2007
DC4	2004	LHC	2000	SD6	2005	VCS	2005
DHA	2000	LM7	2007	SD9	2005	VDL	2003
DHC	2002	LO5	2006	SDA	2003	VGP	2001
DHT	2000	LTC	2000	SDC	2004	VGS	2007
DIC	2005	LUT	2003	SDD	2004	VHC	2007
DL1	2007	MCO	2003	SDG	2007	VHG	2003
DLG	2007	MDC	2007	SDN	2000	VIS	2003
DMC	2004	MHC	1998	SDT	2005	VIT	2007
DNY	2008	MIM	2004	SDU	2007	VKC	2003
DPM	2007	MKV	2002	SEB	2003	VLA	2007
DPR	2006	NAV	2001	SED	2007	VMD	2006
DQC	2005	NBC	2005	SFN	2000	VNE	2005

DRC	2005	NGC	2005	SGC	2004	VNF	2001
DST	2004	NHA	2007	SGD	2004	VNG	2005
DTL	2007	NST	2005	SIC	2004	VNL	1999
DTT	2004	NTP	2004	SJC	2003	VNS	2003
DVP	2002	OCH	2006	SMC	2004	VSC	2002
DZM	2001	ONE	2001	SPM	2007	VSH	2005
EBS	2004	OPC	2002	SPP	2007	VSI	2008
ECI	2007	PAC	2004	SRA	2004	VTB	2004
GIL	2000	PGC	2003	SRC	2005	VXB	2004
GMC	2004	PGS	2007	SSC	2002		
HAD	2003	PGT	2007	SSM	2004		
HAS	2000	PHR	2008	ST8	2002		

(Note) The year of equitization is self-collected from profiles of listed firms on the website
http://cafef.vn/

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